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## Revision and Cladistic Analysis of the *Polyozus* Group of Australian Phylini (Heteroptera: Miridae: Phylinae)

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### ABSTRACT

*Polyozus* Eyles and Schuh, 2003 was described as a monotypic genus from New Zealand. Seven new Australian species are described and *Orthotylus australianus* (Carvalho, 1965) is transferred to *Polyozus*. Cladistic analysis of the nine species of *Polyozus* and seven additional, related species resulted in the hypothesis that *Polyozus* is a monophyletic group, with *Ancoraphyllus*, n.gen., with four species, being its sister group. Another new genus, *Exocarpocoris*, n.gen., with three species, is the sister group of *Ancoraphyllus* + *Polyozus*. The three species of *Exocarpocoris* live on the same host plant, the hemiparasite *Exocarpos aphyllus* (Santalaceae), and occur sympatrically over most of their distribution. Species of *Ancoraphyllus* and *Polyozus* are mainly restricted to a variety of legumes, most often *Acacia* (Fabaceae, Mimosoideae), but also *Jacksonia* (Fabaceae, Papilionoideae) and *Senna* (Fabaceae, Caesalpinoideae). Species of *Polyozus* are widely distributed in Australia. *Polyozus galbanus* Eyles and Schuh, 2003—originally described from New Zealand—also occurs in New South Wales, South Australia, and Tasmania and is here proposed to have been introduced to New Zealand from Australia along with its host plant.

### INTRODUCTION

*Polyozus* Eyles and Schuh, 2003 was described as a monotypic genus from New Zealand with the type species *Polyozus galbanus* Eyles and Schuh, 2003. Sorting and dissecting large numbers of Phylinae from

Australia, which were mainly collected over the past 10 years by Randall T. Schuh and Gerasimos Cassis, but also material on loan from several institutions revealed that the genus *Polyozus* is by no means restricted to New Zealand, but has at least seven undescribed species in Australia. Furthermore,

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Carvalho's description and genitalic illustrations of *Orthotylus australianus* (Carvalho, 1965) indicate that this species, which was placed in the Orthotylinae, is in fact another species of the genus *Polyozus*. Apart from the nine species of *Polyozus*, an additional seven species, which have several characters in common with species of the genus *Polyozus*, are treated in this revision and cladistic analysis of the group.

The so-called *Polyozus* group appears to be distinct among Australian Phylini. A cladistic analysis shows that it is well supported by several synapomorphies, among them a short labium, the combination of simple/suberect and flattened/subadpressed setation, the J-shaped vesica with a process arising close to the secondary gonopore, the dorsal apical process bent in an right angle, which renders the apex of the vesica virtually anchor-shaped, and characters of the female genitalia. The genus *Polyozus* is supported as a monophyletic group. The seven species of the ingroup, which are not part of *Polyozus*, fall into two distinct clades and are here placed in the genera *Ancoraphylus*, n.gen. (four species) and *Exocarpocoris*, n.gen. (three species).

Host records for the 16 species treated in this paper are given, optimized on the cladistic hypothesis, and discussed. The distributions of the plant bug species are documented and discussed.

## METHODS

About 1370 specimens were examined. Matrix code labels were attached to all specimens, which uniquely identify them, and are thus called unique specimen identifiers (USIs). The USI numbers (e.g., AMNH\_PBI 00094810), which comprise an institution and a project code (AMNH\_PBI) and a unique number (00094810), are provided for all specimens.

Habitus photographs (taken on a Microptics-USA photographic system equipped with an Infinity Photo-Optical K-2 lens system) and illustrations of male genitalia are provided for all taxa. Drawings of female genitalia, including a dorsal view of the bursa copulatrix and associated structures, as well as a ventral view of the posterior wall, are

provided for one representative of each genus. Scanning electron micrographs (SEMs) are given for at least one representative of each genus, documenting the habitus in lateral view, vestiture, pretarsi, and the evaporatory areas associated with the metathoracic scent gland. Additional SEMs for selected representatives show details of the male genitalia, including the pygophore, paramere, and vesica.

Unless otherwise stated, the right paramere is drawn in dorsolateral view, the left paramere is drawn in anterolateral view, the lateral right side of the phallosome is shown, and the vesica is drawn in lateral view from the left side. See table 1 for measurements.

Specimens were deposited in and/or borrowed from the following institutions. Abbreviations for institutions follow the suggestions by Arnett et al. (1993). The institutional abbreviations listed are used throughout this paper:

|      |                                                                                             |
|------|---------------------------------------------------------------------------------------------|
| AM   | Australian Museum, Sydney                                                                   |
| AMNH | American Museum of Natural History, New York                                                |
| CNC  | Canadian National Collection of Insects, Agriculture and Agri-Food Canada, Ottawa           |
| MAGD | Museum of the Northern Territory, Darwin                                                    |
| MNRJ | Museu Nacional, Rio de Janeiro                                                              |
| SAMA | South Australian Museum, Adelaide                                                           |
| USNM | [United States] National Museum of Natural History, Smithsonian Institution, Washington, DC |
| WAMP | Western Australian Museum, Perth                                                            |
| ZISP | Russian Academy of Sciences, Zoological Institute, St. Petersburg                           |

Host plants collected during the R.T. Schuh and Gerasimos Cassis collecting trips were deposited at the National Herbarium of New South Wales (Sydney) or the Western Australian Herbarium (Perth). The numbers provided with the plant identifications are voucher numbers of these institutions.

The distribution of host plants mentioned in the discussions and host plant sections are derived from the website of the Australia's Virtual Herbarium (AVH) (<http://www.cpbr.gov.au/avh/>).

The distribution maps for Phylinae are drawn in a Mercator projection. The Dis-

TABLE 1  
Measurements of Species

|                   |       | Length |         |      |      |      |      | Width |      |      |         |         |
|-------------------|-------|--------|---------|------|------|------|------|-------|------|------|---------|---------|
|                   |       | Body   | CunClyp | Head | Pron | Scut | Cun  | Head  | Pron | Scut | InterOc | AntSeg2 |
| <i>A. arctous</i> |       |        |         |      |      |      |      |       |      |      |         |         |
| M (N=5)           | Mean  | 2.96   | 2.02    | 0.18 | 0.38 | 0.38 | 0.44 | 0.69  | 0.96 | 0.53 | 0.37    | 0.79    |
|                   | SD    | 0.13   | 0.03    | 0.03 | 0.03 | 0.02 | 0.05 | 0.03  | 0.04 | 0.01 | 0.02    | 0.07    |
|                   | Range | 0.32   | 0.09    | 0.06 | 0.08 | 0.05 | 0.11 | 0.06  | 0.10 | 0.02 | 0.05    | 0.17    |
|                   | Min   | 2.84   | 1.98    | 0.15 | 0.34 | 0.36 | 0.38 | 0.66  | 0.90 | 0.52 | 0.36    | 0.70    |
|                   | Max   | 3.17   | 2.07    | 0.21 | 0.42 | 0.40 | 0.49 | 0.72  | 1.00 | 0.54 | 0.41    | 0.87    |
| F (N=5)           | Mean  | 2.98   | 2.01    | 0.18 | 0.42 | 0.36 | 0.45 | 0.70  | 0.98 | 0.51 | 0.41    | 0.77    |
|                   | SD    | 0.13   | 0.08    | 0.02 | 0.03 | 0.03 | 0.03 | 0.03  | 0.03 | 0.04 | 0.02    | 0.06    |
|                   | Range | 0.33   | 0.20    | 0.06 | 0.07 | 0.07 | 0.07 | 0.07  | 0.06 | 0.11 | 0.0     | 0.15    |
|                   | Min   | 2.77   | 1.87    | 0.14 | 0.39 | 0.32 | 0.42 | 0.67  | 0.94 | 0.45 | 0.37    | 0.71    |
|                   | Max   | 3.11   | 2.07    | 0.20 | 0.46 | 0.39 | 0.48 | 0.74  | 1.00 | 0.56 | 0.43    | 0.86    |
| <i>A. auski</i>   |       |        |         |      |      |      |      |       |      |      |         |         |
| M (N=5)           | Mean  | 3.22   | 1.99    | 0.16 | 0.35 | 0.39 | 0.58 | 0.69  | 1.01 | 0.52 | 0.32    | 0.72    |
|                   | SD    | 0.30   | 0.16    | 0.04 | 0.07 | 0.02 | 0.03 | 0.03  | 0.06 | 0.03 | 0.02    | 0.03    |
|                   | Range | 0.80   | 0.43    | 0.09 | 0.17 | 0.04 | 0.06 | 0.07  | 0.15 | 0.08 | 0.06    | 0.07    |
|                   | Min   | 2.77   | 1.80    | 0.11 | 0.27 | 0.36 | 0.55 | 0.66  | 0.93 | 0.48 | 0.29    | 0.68    |
|                   | Max   | 3.57   | 2.23    | 0.20 | 0.44 | 0.40 | 0.61 | 0.72  | 1.09 | 0.57 | 0.35    | 0.74    |
| F (N=5)           | Mean  | 3.13   | 2.02    | 0.19 | 0.41 | 0.39 | 0.52 | 0.69  | 1.03 | 0.52 | 0.37    | 0.68    |
|                   | SD    | 0.12   | 0.08    | 0.02 | 0.03 | 0.02 | 0.05 | 0.01  | 0.07 | 0.04 | 0.01    | 0.07    |
|                   | Range | 0.32   | 0.23    | 0.05 | 0.09 | 0.05 | 0.14 | 0.04  | 0.16 | 0.12 | 0.02    | 0.16    |
|                   | Min   | 2.94   | 1.91    | 0.16 | 0.36 | 0.37 | 0.44 | 0.67  | 0.97 | 0.44 | 0.36    | 0.62    |
|                   | Max   | 3.26   | 2.14    | 0.21 | 0.45 | 0.42 | 0.58 | 0.71  | 1.13 | 0.56 | 0.38    | 0.78    |
| <i>A. carolus</i> |       |        |         |      |      |      |      |       |      |      |         |         |
| M (N=4)           | Mean  | 2.84   | 1.88    | 0.16 | 0.35 | 0.36 | 0.45 | 0.67  | 0.94 | 0.47 | 0.34    | 0.76    |
|                   | SD    | 0.07   | 0.08    | 0.03 | 0.01 | 0.03 | 0.04 | 0.03  | 0.04 | 0.01 | 0.02    | 0.04    |
|                   | Range | 0.15   | 0.18    | 0.06 | 0.03 | 0.06 | 0.10 | 0.08  | 0.10 | 0.03 | 0.03    | 0.08    |
|                   | Min   | 2.79   | 1.78    | 0.12 | 0.34 | 0.32 | 0.41 | 0.63  | 0.88 | 0.46 | 0.32    | 0.72    |
|                   | Max   | 2.94   | 1.96    | 0.18 | 0.37 | 0.38 | 0.50 | 0.71  | 0.98 | 0.49 | 0.36    | 0.80    |
| F (N=4)           | Mean  | 2.83   | 1.84    | 0.16 | 0.35 | 0.38 | 0.49 | 0.64  | 0.91 | 0.48 | 0.34    | 0.79    |
|                   | SD    | 0.09   | 0.11    | 0.03 | 0.04 | 0.03 | 0.02 | 0.03  | 0.06 | 0.04 | 0.01    | 0.03    |
|                   | Range | 0.19   | 0.26    | 0.06 | 0.08 | 0.06 | 0.04 | 0.06  | 0.12 | 0.08 | 0.03    | 0.07    |
|                   | Min   | 2.69   | 1.69    | 0.14 | 0.31 | 0.36 | 0.46 | 0.62  | 0.88 | 0.44 | 0.33    | 0.76    |
|                   | Max   | 2.88   | 1.95    | 0.20 | 0.38 | 0.41 | 0.50 | 0.68  | 1.00 | 0.52 | 0.35    | 0.83    |
| <i>A. mariala</i> |       |        |         |      |      |      |      |       |      |      |         |         |
| M (N=5)           | Mean  | 2.96   | 2.02    | 0.18 | 0.38 | 0.38 | 0.44 | 0.69  | 0.96 | 0.53 | 0.37    | 0.79    |
|                   | SD    | 0.13   | 0.03    | 0.03 | 0.03 | 0.02 | 0.05 | 0.03  | 0.04 | 0.01 | 0.02    | 0.07    |
|                   | Range | 0.32   | 0.09    | 0.06 | 0.08 | 0.05 | 0.11 | 0.06  | 0.10 | 0.02 | 0.05    | 0.17    |
|                   | Min   | 2.84   | 1.98    | 0.15 | 0.34 | 0.36 | 0.38 | 0.66  | 0.90 | 0.52 | 0.36    | 0.70    |
|                   | Max   | 3.17   | 2.07    | 0.21 | 0.42 | 0.40 | 0.49 | 0.72  | 1.00 | 0.54 | 0.41    | 0.87    |
| F (N=5)           | Mean  | 2.98   | 2.01    | 0.18 | 0.42 | 0.36 | 0.45 | 0.70  | 0.98 | 0.51 | 0.41    | 0.77    |
|                   | SD    | 0.13   | 0.08    | 0.02 | 0.03 | 0.03 | 0.03 | 0.03  | 0.03 | 0.04 | 0.02    | 0.06    |
|                   | Range | 0.33   | 0.20    | 0.06 | 0.07 | 0.07 | 0.07 | 0.07  | 0.06 | 0.11 | 0.06    | 0.15    |
|                   | Min   | 2.77   | 1.87    | 0.14 | 0.39 | 0.32 | 0.42 | 0.67  | 0.94 | 0.45 | 0.37    | 0.71    |
|                   | Max   | 3.11   | 2.07    | 0.20 | 0.46 | 0.39 | 0.48 | 0.74  | 1.00 | 0.56 | 0.43    | 0.86    |
| <i>E. aurum</i>   |       |        |         |      |      |      |      |       |      |      |         |         |
| M (N=5)           | Mean  | 2.66   | 1.82    | 0.13 | 0.39 | 0.41 | 0.37 | 0.80  | 1.14 | 0.57 | 0.43    | 0.67    |
|                   | SD    | 0.18   | 0.11    | 0.02 | 0.05 | 0.03 | 0.05 | 0.03  | 0.04 | 0.05 | 0.02    | 0.04    |
|                   | Range | 0.45   | 0.26    | 0.06 | 0.11 | 0.06 | 0.13 | 0.07  | 0.10 | 0.11 | 0.06    | 0.08    |
|                   | Min   | 2.40   | 1.69    | 0.10 | 0.35 | 0.37 | 0.28 | 0.76  | 1.10 | 0.52 | 0.40    | 0.64    |
|                   | Max   | 2.85   | 1.94    | 0.16 | 0.46 | 0.44 | 0.41 | 0.83  | 1.20 | 0.63 | 0.46    | 0.72    |
| F (N=5)           | Mean  | 2.88   | 1.99    | 0.14 | 0.41 | 0.42 | 0.40 | 0.83  | 1.20 | 0.61 | 0.46    | 0.70    |
|                   | SD    | 0.06   | 0.05    | 0.02 | 0.05 | 0.01 | 0.06 | 0.02  | 0.03 | 0.03 | 0.02    | 0.08    |
|                   | Range | 0.16   | 0.12    | 0.05 | 0.11 | 0.02 | 0.12 | 0.05  | 0.07 | 0.08 | 0.04    | 0.18    |
|                   | Min   | 2.83   | 1.95    | 0.12 | 0.35 | 0.41 | 0.34 | 0.81  | 1.16 | 0.58 | 0.45    | 0.62    |
|                   | Max   | 2.98   | 2.07    | 0.17 | 0.46 | 0.42 | 0.46 | 0.85  | 1.23 | 0.66 | 0.48    | 0.80    |

TABLE 1  
(Continued)

|                        |       | Length |         |      |      |      |      | Width |      |      |         |         |
|------------------------|-------|--------|---------|------|------|------|------|-------|------|------|---------|---------|
|                        |       | Body   | CunClyp | Head | Pron | Scut | Cun  | Head  | Pron | Scut | InterOc | AntSeg2 |
| <i>E. praegracilis</i> |       |        |         |      |      |      |      |       |      |      |         |         |
| M (N=4)                | Mean  | 2.91   | 1.93    | 0.18 | 0.41 | 0.37 | 0.45 | 0.76  | 1.04 | 0.55 | 0.38    | 0.82    |
|                        | SD    | 0.04   | 0.04    | 0.04 | 0.04 | 0.03 | 0.04 | 0.02  | 0.03 | 0.03 | 0.02    | 0.05    |
|                        | Range | 0.09   | 0.10    | 0.08 | 0.10 | 0.06 | 0.08 | 0.06  | 0.07 | 0.06 | 0.04    | 0.11    |
|                        | Min   | 2.85   | 1.87    | 0.16 | 0.36 | 0.35 | 0.41 | 0.73  | 1.01 | 0.53 | 0.36    | 0.77    |
|                        | Max   | 2.94   | 1.98    | 0.23 | 0.46 | 0.41 | 0.49 | 0.79  | 1.07 | 0.59 | 0.39    | 0.89    |
| <i>E. tantulus</i>     |       |        |         |      |      |      |      |       |      |      |         |         |
| M (N=5)                | Mean  | 2.25   | 1.56    | 0.12 | 0.30 | 0.33 | 0.35 | 0.79  | 0.98 | 0.52 | 0.44    | 0.57    |
|                        | SD    | 0.12   | 0.04    | 0.03 | 0.02 | 0.03 | 0.04 | 0.02  | 0.04 | 0.04 | 0.02    | 0.05    |
|                        | Range | 0.31   | 0.11    | 0.08 | 0.05 | 0.07 | 0.11 | 0.06  | 0.12 | 0.08 | 0.05    | 0.12    |
|                        | Min   | 2.07   | 1.49    | 0.08 | 0.28 | 0.29 | 0.31 | 0.76  | 0.92 | 0.48 | 0.43    | 0.50    |
|                        | Max   | 2.37   | 1.59    | 0.16 | 0.33 | 0.36 | 0.42 | 0.83  | 1.04 | 0.55 | 0.48    | 0.63    |
| F (N=5)                | Mean  | 2.48   | 1.68    | 0.13 | 0.31 | 0.37 | 0.41 | 0.78  | 0.99 | 0.50 | 0.46    | 0.60    |
|                        | SD    | 0.05   | 0.05    | 0.01 | 0.03 | 0.01 | 0.01 | 0.03  | 0.04 | 0.03 | 0.02    | 0.07    |
|                        | Range | 0.13   | 0.13    | 0.02 | 0.06 | 0.02 | 0.04 | 0.06  | 0.10 | 0.08 | 0.05    | 0.17    |
|                        | Min   | 2.41   | 1.62    | 0.12 | 0.27 | 0.36 | 0.40 | 0.76  | 0.95 | 0.46 | 0.43    | 0.51    |
|                        | Max   | 2.54   | 1.74    | 0.14 | 0.34 | 0.38 | 0.43 | 0.83  | 1.05 | 0.54 | 0.48    | 0.68    |
| <i>P. australianus</i> |       |        |         |      |      |      |      |       |      |      |         |         |
| M (N=5)                | Mean  | 3.28   | 2.11    | 0.12 | 0.36 | 0.42 | 0.64 | 0.61  | 1.00 | 0.48 | 0.25    | 0.95    |
|                        | SD    | 0.10   | 0.06    | 0.03 | 0.04 | 0.03 | 0.06 | 0.02  | 0.04 | 0.01 | 0.01    | 0.06    |
|                        | Range | 0.23   | 0.13    | 0.06 | 0.08 | 0.06 | 0.16 | 0.06  | 0.11 | 0.03 | 0.02    | 0.15    |
|                        | Min   | 3.20   | 2.07    | 0.08 | 0.31 | 0.38 | 0.59 | 0.57  | 0.93 | 0.45 | 0.24    | 0.90    |
|                        | Max   | 3.43   | 2.20    | 0.14 | 0.39 | 0.44 | 0.75 | 0.63  | 1.04 | 0.49 | 0.26    | 1.05    |
| F (N=5)                | Mean  | 3.09   | 2.07    | 0.17 | 0.35 | 0.39 | 0.54 | 0.61  | 0.99 | 0.49 | 0.30    | 0.85    |
|                        | SD    | 0.30   | 0.14    | 0.04 | 0.03 | 0.04 | 0.09 | 0.02  | 0.04 | 0.04 | 0.02    | 0.03    |
|                        | Range | 0.70   | 0.32    | 0.08 | 0.08 | 0.10 | 0.22 | 0.05  | 0.12 | 0.11 | 0.05    | 0.07    |
|                        | Min   | 2.70   | 1.89    | 0.12 | 0.33 | 0.36 | 0.41 | 0.59  | 0.94 | 0.43 | 0.27    | 0.81    |
|                        | Max   | 3.40   | 2.21    | 0.20 | 0.40 | 0.46 | 0.64 | 0.64  | 1.06 | 0.54 | 0.32    | 0.88    |
| <i>P. bulita</i>       |       |        |         |      |      |      |      |       |      |      |         |         |
| M (N=5)                | Mean  | 3.17   | 2.25    | 0.20 | 0.53 | 0.47 | 0.53 | 0.84  | 1.30 | 0.61 | 0.27    | 1.01    |
|                        | SD    | 0.24   | 0.07    | 0.03 | 0.04 | 0.03 | 0.06 | 0.03  | 0.06 | 0.04 | 0.03    | 0.03    |
|                        | Range | 0.65   | 0.16    | 0.07 | 0.10 | 0.07 | 0.17 | 0.08  | 0.16 | 0.10 | 0.09    | 0.06    |
|                        | Min   | 2.86   | 2.15    | 0.17 | 0.49 | 0.42 | 0.46 | 0.79  | 1.21 | 0.56 | 0.22    | 0.99    |
|                        | Max   | 3.51   | 2.31    | 0.24 | 0.59 | 0.49 | 0.62 | 0.87  | 1.37 | 0.66 | 0.31    | 1.05    |
| F (N=5)                | Mean  | 3.17   | 2.26    | 0.18 | 0.49 | 0.48 | 0.47 | 0.82  | 1.35 | 0.60 | 0.35    | 1.00    |
|                        | SD    | 0.05   | 0.15    | 0.05 | 0.04 | 0.02 | 0.08 | 0.07  | 0.04 | 0.08 | 0.02    | 0.06    |
|                        | Range | 0.12   | 0.35    | 0.14 | 0.11 | 0.05 | 0.17 | 0.15  | 0.11 | 0.20 | 0.05    | 0.15    |
|                        | Min   | 3.11   | 2.13    | 0.12 | 0.44 | 0.47 | 0.41 | 0.75  | 1.30 | 0.51 | 0.34    | 0.94    |
|                        | Max   | 3.22   | 2.48    | 0.26 | 0.55 | 0.51 | 0.57 | 0.90  | 1.41 | 0.71 | 0.38    | 1.09    |
| <i>P. furcilla</i>     |       |        |         |      |      |      |      |       |      |      |         |         |
| M (N=5)                | Mean  | 2.74   | 1.76    | 0.15 | 0.33 | 0.32 | 0.50 | 0.58  | 0.91 | 0.45 | 0.27    | 0.65    |
|                        | SD    | 0.09   | 0.02    | 0.03 | 0.02 | 0.03 | 0.01 | 0.01  | 0.03 | 0.03 | 0.01    | 0.04    |
|                        | Range | 0.24   | 0.04    | 0.07 | 0.06 | 0.07 | 0.02 | 0.03  | 0.07 | 0.07 | 0.03    | 0.09    |
|                        | Min   | 2.64   | 1.74    | 0.11 | 0.30 | 0.28 | 0.49 | 0.57  | 0.88 | 0.41 | 0.25    | 0.62    |
|                        | Max   | 2.88   | 1.78    | 0.18 | 0.36 | 0.35 | 0.51 | 0.60  | 0.95 | 0.48 | 0.28    | 0.71    |
| F (N=5)                | Mean  | 2.62   | 1.66    | 0.15 | 0.31 | 0.32 | 0.47 | 0.57  | 0.90 | 0.46 | 0.31    | 0.59    |
|                        | SD    | 0.08   | 0.05    | 0.03 | 0.02 | 0.02 | 0.03 | 0.03  | 0.06 | 0.04 | 0.02    | 0.05    |
|                        | Range | 0.21   | 0.12    | 0.06 | 0.05 | 0.05 | 0.07 | 0.06  | 0.12 | 0.10 | 0.05    | 0.10    |
|                        | Min   | 2.52   | 1.62    | 0.11 | 0.28 | 0.29 | 0.42 | 0.54  | 0.82 | 0.41 | 0.28    | 0.53    |
|                        | Max   | 2.73   | 1.74    | 0.17 | 0.34 | 0.34 | 0.49 | 0.60  | 0.95 | 0.51 | 0.32    | 0.64    |
| <i>P. galbanus</i>     |       |        |         |      |      |      |      |       |      |      |         |         |
| M (N=5)                | Mean  | 3.70   | 2.32    | 0.19 | 0.40 | 0.45 | 0.68 | 0.70  | 1.07 | 0.54 | 0.28    | 0.94    |
|                        | SD    | 0.14   | 0.09    | 0.04 | 0.01 | 0.02 | 0.04 | 0.03  | 0.03 | 0.03 | 0.01    | 0.11    |
|                        | Range | 0.35   | 0.22    | 0.08 | 0.03 | 0.05 | 0.09 | 0.08  | 0.08 | 0.08 | 0.03    | 0.29    |
|                        | Min   | 3.51   | 2.24    | 0.15 | 0.39 | 0.42 | 0.64 | 0.65  | 1.03 | 0.49 | 0.26    | 0.75    |
|                        | Max   | 3.86   | 2.46    | 0.23 | 0.42 | 0.47 | 0.73 | 0.73  | 1.11 | 0.57 | 0.30    | 1.04    |

TABLE 1  
(Continued)

|                                |       | Length |         |      |      |      |      | Width |      |      |         |         |
|--------------------------------|-------|--------|---------|------|------|------|------|-------|------|------|---------|---------|
|                                |       | Body   | CunClyp | Head | Pron | Scut | Cun  | Head  | Pron | Scut | InterOc | AntSeg2 |
| <i>P. galbanus</i> (continued) |       |        |         |      |      |      |      |       |      |      |         |         |
| <i>F</i> (N=5)                 | Mean  | 3.38   | 2.23    | 0.23 | 0.42 | 0.43 | 0.57 | 0.67  | 1.14 | 0.59 | 0.34    | 0.86    |
|                                | SD    | 0.29   | 0.19    | 0.06 | 0.04 | 0.04 | 0.09 | 0.05  | 0.11 | 0.06 | 0.02    | 0.05    |
|                                | Range | 0.73   | 0.47    | 0.14 | 0.11 | 0.10 | 0.24 | 0.12  | 0.25 | 0.14 | 0.04    | 0.11    |
|                                | Min   | 2.90   | 1.90    | 0.18 | 0.35 | 0.38 | 0.43 | 0.60  | 0.99 | 0.49 | 0.32    | 0.81    |
|                                | Max   | 3.63   | 2.37    | 0.32 | 0.45 | 0.47 | 0.67 | 0.72  | 1.24 | 0.63 | 0.36    | 0.92    |
| <i>P. kojonup</i>              |       |        |         |      |      |      |      |       |      |      |         |         |
| <i>M</i> (N=7)                 | Mean  | 4.09   | 2.63    | 0.22 | 0.49 | 0.48 | 0.75 | 0.79  | 1.19 | 0.60 | 0.30    | 1.12    |
|                                | SD    | 0.30   | 0.17    | 0.01 | 0.05 | 0.03 | 0.07 | 0.03  | 0.07 | 0.04 | 0.03    | 0.11    |
|                                | Range | 0.75   | 0.43    | 0.03 | 0.14 | 0.09 | 0.19 | 0.08  | 0.18 | 0.11 | 0.06    | 0.27    |
|                                | Min   | 3.70   | 2.40    | 0.20 | 0.45 | 0.44 | 0.66 | 0.75  | 1.09 | 0.54 | 0.27    | 0.97    |
|                                | Max   | 4.44   | 2.83    | 0.24 | 0.59 | 0.53 | 0.85 | 0.83  | 1.27 | 0.65 | 0.34    | 1.24    |
| <i>F</i> (N=9)                 | Mean  | 3.75   | 2.50    | 0.20 | 0.45 | 0.48 | 0.64 | 0.76  | 1.23 | 0.62 | 0.38    | 1.00    |
|                                | SD    | 0.29   | 0.19    | 0.03 | 0.05 | 0.03 | 0.07 | 0.04  | 0.08 | 0.04 | 0.03    | 0.17    |
|                                | Range | 0.82   | 0.55    | 0.07 | 0.15 | 0.10 | 0.22 | 0.14  | 0.18 | 0.14 | 0.09    | 0.41    |
|                                | Min   | 3.37   | 2.22    | 0.18 | 0.37 | 0.43 | 0.51 | 0.69  | 1.14 | 0.56 | 0.34    | 0.80    |
|                                | Max   | 4.19   | 2.77    | 0.25 | 0.52 | 0.53 | 0.73 | 0.83  | 1.32 | 0.69 | 0.43    | 1.21    |
| <i>P. kuringgai</i>            |       |        |         |      |      |      |      |       |      |      |         |         |
| <i>M</i> (N=5)                 | Mean  | 3.66   | 2.30    | 0.17 | 0.37 | 0.46 | 0.67 | 0.67  | 1.12 | 0.59 | 0.30    | 0.95    |
|                                | SD    | 0.16   | 0.13    | 0.02 | 0.03 | 0.03 | 0.04 | 0.03  | 0.05 | 0.04 | 0.02    | 0.08    |
|                                | Range | 0.44   | 0.36    | 0.05 | 0.06 | 0.06 | 0.11 | 0.07  | 0.13 | 0.11 | 0.05    | 0.17    |
|                                | Min   | 3.45   | 2.12    | 0.15 | 0.35 | 0.41 | 0.62 | 0.62  | 1.07 | 0.54 | 0.28    | 0.86    |
|                                | Max   | 3.89   | 2.47    | 0.20 | 0.40 | 0.47 | 0.73 | 0.70  | 1.19 | 0.64 | 0.33    | 1.03    |
| <i>F</i> (N=5)                 | Mean  | 3.38   | 2.23    | 0.20 | 0.41 | 0.40 | 0.58 | 0.65  | 1.08 | 0.54 | 0.32    | 0.90    |
|                                | SD    | 0.16   | 0.07    | 0.03 | 0.03 | 0.01 | 0.03 | 0.01  | 0.01 | 0.03 | 0.02    | 0.05    |
|                                | Range | 0.38   | 0.18    | 0.07 | 0.07 | 0.04 | 0.08 | 0.03  | 0.03 | 0.06 | 0.06    | 0.11    |
|                                | Min   | 3.12   | 2.10    | 0.16 | 0.37 | 0.38 | 0.55 | 0.63  | 1.07 | 0.52 | 0.29    | 0.85    |
|                                | Max   | 3.50   | 2.28    | 0.23 | 0.44 | 0.42 | 0.63 | 0.66  | 1.10 | 0.58 | 0.35    | 0.97    |
| <i>P. manilla</i>              |       |        |         |      |      |      |      |       |      |      |         |         |
| <i>M</i> (N=5)                 | Mean  | 3.18   | 2.00    | 0.16 | 0.35 | 0.40 | 0.59 | 0.67  | 1.04 | 0.52 | 0.26    | 0.81    |
|                                | SD    | 0.16   | 0.05    | 0.01 | 0.05 | 0.02 | 0.04 | 0.01  | 0.03 | 0.02 | 0.02    | 0.06    |
|                                | Range | 0.41   | 0.13    | 0.02 | 0.12 | 0.05 | 0.09 | 0.02  | 0.09 | 0.04 | 0.04    | 0.15    |
|                                | Min   | 3.02   | 1.91    | 0.15 | 0.29 | 0.37 | 0.55 | 0.66  | 1.01 | 0.50 | 0.24    | 0.70    |
|                                | Max   | 3.43   | 2.05    | 0.17 | 0.41 | 0.42 | 0.63 | 0.68  | 1.09 | 0.54 | 0.27    | 0.85    |
| <i>F</i> (N=5)                 | Mean  | 3.03   | 1.96    | 0.16 | 0.35 | 0.39 | 0.52 | 0.63  | 1.05 | 0.53 | 0.31    | 0.74    |
|                                | SD    | 0.08   | 0.05    | 0.03 | 0.02 | 0.02 | 0.02 | 0.01  | 0.03 | 0.03 | 0.02    | 0.01    |
|                                | Range | 0.21   | 0.12    | 0.07 | 0.04 | 0.04 | 0.05 | 0.03  | 0.08 | 0.06 | 0.04    | 0.03    |
|                                | Min   | 2.91   | 1.90    | 0.13 | 0.32 | 0.36 | 0.50 | 0.62  | 1.02 | 0.49 | 0.29    | 0.72    |
|                                | Max   | 3.12   | 2.02    | 0.20 | 0.36 | 0.40 | 0.55 | 0.65  | 1.10 | 0.55 | 0.33    | 0.75    |
| <i>P. mina</i>                 |       |        |         |      |      |      |      |       |      |      |         |         |
| <i>M</i> (N=5)                 | Mean  | 2.92   | 1.91    | 0.15 | 0.34 | 0.36 | 0.51 | 0.64  | 1.00 | 0.48 | 0.28    | 0.78    |
|                                | SD    | 0.21   | 0.15    | 0.05 | 0.04 | 0.03 | 0.06 | 0.01  | 0.03 | 0.03 | 0.02    | 0.06    |
|                                | Range | 0.58   | 0.37    | 0.13 | 0.10 | 0.07 | 0.15 | 0.03  | 0.07 | 0.07 | 0.04    | 0.15    |
|                                | Min   | 2.60   | 1.70    | 0.11 | 0.30 | 0.34 | 0.44 | 0.62  | 0.97 | 0.44 | 0.26    | 0.71    |
|                                | Max   | 3.18   | 2.08    | 0.24 | 0.40 | 0.41 | 0.59 | 0.65  | 1.04 | 0.51 | 0.30    | 0.86    |
| <i>F</i> (N=3)                 | Mean  | 2.69   | 1.86    | 0.17 | 0.39 | 0.30 | 0.39 | 0.63  | 0.97 | 0.47 | 0.33    | 0.63    |
|                                | SD    | 0.07   | 0.03    | 0.03 | 0.04 | 0.05 | 0.09 | 0.06  | 0.11 | 0.06 | 0.04    | 0.05    |
|                                | Range | 0.13   | 0.06    | 0.05 | 0.07 | 0.10 | 0.17 | 0.12  | 0.19 | 0.13 | 0.09    | 0.09    |
|                                | Min   | 2.64   | 1.82    | 0.14 | 0.36 | 0.25 | 0.31 | 0.59  | 0.90 | 0.40 | 0.29    | 0.60    |
|                                | Max   | 2.76   | 1.88    | 0.20 | 0.43 | 0.35 | 0.48 | 0.70  | 1.09 | 0.52 | 0.38    | 0.69    |
| <i>P. tridens</i>              |       |        |         |      |      |      |      |       |      |      |         |         |
| <i>M</i> (N=2)                 | Mean  | 2.62   | 1.68    | 0.14 | 0.29 | 0.33 | 0.45 | 0.56  | 0.86 | 0.43 | 0.25    | 0.64    |
|                                | SD    | 0.21   | 0.14    | 0.03 | 0.02 | 0.02 | 0.03 | 0.01  | 0.04 | 0.02 | 0.03    | 0.09    |
|                                | Range | 0.30   | 0.20    | 0.05 | 0.03 | 0.02 | 0.05 | 0.01  | 0.05 | 0.04 | 0.04    | 0.13    |
|                                | Min   | 2.47   | 1.58    | 0.12 | 0.27 | 0.32 | 0.43 | 0.56  | 0.84 | 0.41 | 0.23    | 0.58    |
|                                | Max   | 2.77   | 1.78    | 0.17 | 0.30 | 0.34 | 0.48 | 0.57  | 0.89 | 0.45 | 0.27    | 0.70    |
| <i>F</i> (N=5)                 | Mean  | 2.40   | 1.63    | 0.14 | 0.30 | 0.31 | 0.38 | 0.56  | 0.90 | 0.46 | 0.30    | 0.52    |
|                                | SD    | 0.07   | 0.07    | 0.02 | 0.02 | 0.04 | 0.08 | 0.01  | 0.05 | 0.02 | 0.01    | 0.07    |
|                                | Range | 0.19   | 0.18    | 0.06 | 0.04 | 0.09 | 0.22 | 0.03  | 0.14 | 0.06 | 0.02    | 0.18    |
|                                | Min   | 2.30   | 1.57    | 0.12 | 0.28 | 0.24 | 0.28 | 0.55  | 0.83 | 0.43 | 0.29    | 0.40    |
|                                | Max   | 2.50   | 1.74    | 0.18 | 0.32 | 0.33 | 0.50 | 0.58  | 0.97 | 0.49 | 0.31    | 0.58    |

cover Life homepage (<http://www.discoverlife.org/>) gives online maps of the species as well as images of plant bugs and host plants.

**CLADISTIC ANALYSIS:** Nineteen taxa comprising 16 ingroup species and 3 outgroup species were analyzed using 43 morphological characters. The characters are listed in table 2. Most characters are illustrated and character and character states pointed out in the illustrations (e.g., 2-0 in fig. 3E refers to character 2 and state 0 in table 2). The matrix is provided as table 3. Sixteen characters were coded as multistate, eight of which were coded as nonadditive (11, 17, 22, 24, 29, 36, 37, 41). The ingroup species comprise the three species of *Exocarpocoris*, four species of *Ancoraphylus*, and 9 species of *Polyozus*, all of which are revised herein. The three outgroup species of Phylini used, which are deposited at the AMNH, are an unidentified species of *Campylomma* from Australia, *Opuna annulatus* (Knight, 1935), with an Indopacific distribution, and an undescribed Australian species close to or congeneric with *Xiphoides* Eyles and Schuh, 2003 (referred to as *Xiphoides* for the purposes of this project).

The heuristic search under equal weights was run through WinClada in NONA (hold10000; hold/100; mult\*100;) (fig. 18). The relative degree of support for each node was calculated with NONA using up to 10 extra steps (h10000; bsupport10;) and is shown on figure 18 above the branches in square boxes. Pee-Wee was used for analysis with implied weighting (hold10000; hold/100; mult\*100; jump50;), with a  $k$  value of  $N = 3$  (fig. 19). The character distributions shown in figures 18 and 19 are unambiguous optimizations (homoplasy setting: any additional step treated as homoplastic), but the consequences of fast and slow character optimization as implemented in WinClada are discussed in the character discussion. Numbers (in gray circles) were assigned to nodes and clades and are referred to in the discussion.

To gain insights into the evolution of insect-host plant relationships in this group of Phylini, the distributions of host plants were analyzed on the cladogram. Following the approach of Carpenter (1989), the host plant genus was coded as a character state,

deactivated during analysis, and then optimized on the unweighted cladogram.

## THE *POLYOZUS* GROUP OF AUSTRALIAN PHYLINI

The *Polyozus* group, as here defined, is characterized by several features of the male and female genitalia, but also by the vestiture with a mixture of simple, suberect and sub-adpressed, flattened setae (fig. 4A–F). Among the characteristic features of the male genitalia are the anchor-shaped (or almost so) vesica of the male, with the dorsal apical process usually projecting at a right angle from the body of the vesica, and a process projecting from the vesica that arises from the area of the secondary gonopore (figs. 12, 13). Among the diagnostic features of the female genitalia are areas beset with microtrichia in the posterior region of the dorsal labiate plate and the ornamentation of the posterior wall, which comprises paired areas of microtrichia and paired processes on the posterior margin (fig. 14).

### KEY TO GENERA OF THE *POLYOZUS* GROUP

1. Head, thorax, and hemelytra uniformly yellowish green, reddish brown, or brown, light green and orange (figs. 1, 2; *Polyozus* spp.); vesica with median apical process in addition to dorsal apical and ventral apical processes (figs. 12, 13) . . . *Polyozus* Eyles and Schuh
- Head, thorax, and hemelytra either cream, yellow and brown or orange, red with cream marks, or cream with red marks (fig. 1; *Ancoraphylus* spp., *Exocarpocoris* spp.); vesica without median apical process, dorsal and ventral apical processes present (fig. 12; *Ancoraphylus* spp., *Exocarpocoris* spp.) . . . 2
2. Head, thorax, and hemelytra orange, red with cream marks, or cream with red marks (fig. 1; *Ancoraphylus* spp.); vesica with process arising from area of secondary gonopore short, curved or coiled, and circular in cross section (fig. 12; *Ancoraphylus* spp.) . . . . . *Ancoraphylus*, n.gen.
- Head, thorax, and hemelytra cream colored to yellow, with brown U-shaped mark on distal part of hemelytron (fig. 1; *Exocarpocoris* spp.); vesica with process arising from area of secondary gonopore long, curved or coiled, broad and flattened (fig. 12; *Exocarpocoris* spp.) . . . . . *Exocarpocoris*, n.gen.

TABLE 2  
List of Characters and Discussion of Character Optimization

The discussion is based on the character distribution on the strict consensus of the unweighted analysis (fig. 18)

#### HABITUS, HEAD, AND THORACIC STRUCTURES

**Character 0:** Habitus of male: elongate (0); elongate ovoid (1); ovoid (2). The slender elongate habitus of the males of *P. australianus* and *P. galbanus* is one of the synapomorphies for the two sister species (clade 15), as is the ovoid body shape of *E. aurum* and *E. tantulus* (clade 3). The ovoid body shape of *P. bulita* is autapomorphic within *Polyozus*, a clade that is otherwise characterized by elongate ovoid body shape.

**Character 1:** Width of vertex: less than twice width of eye (0); more than two times width of eye (1). A very wide vertex (and accordingly very broad head) is a synapomorphy of *E. arum* and *E. tantulus* (clade 3).

**Character 2:** Relative size of eyes: large, as high as head (0); of moderate size (1); small (2). Large eyes that extend over the entire head in lateral view (or almost so) are one of the apomorphic characters that support the genus *Polyozus* as a monophyletic group (clade 8), and small eyes unite *E. arum* and *E. tantulus* (clade 3).

**Character 3:** Relative length of labium: labium not or just reaching base of mesocoxa (0); reaching base of metacoxa (1); reaching apex of metacoxa (2). A short labium that barely reaches the base of the mesocoxa is—according to the present analysis—the ancestral condition for the *Polyozus* group and one of its synapomorphies. Within the clade, the labium becomes longer in several cases (in *E. aurum*; at clade 7 that unites *A. arctous* and *A. mariala*; in *P. bulita*; and at clade 12). Within the clade contained in node 12, an even longer labium evolved independently in *P. kurringai* and *P. australianus*.

**Character 4:** Shape of pronotum: pronotum about as wide as long (0); wider than long (1); much wider than long (2). The plesiomorphic condition for the *Polyozus* group is a pronotum that is slightly wider than long, as it is also observed in the outgroup representatives used in the present analysis. *P. kojonup* has a long pronotum and one of the synapomorphies of *E. aurum* and *E. tantulus* is a very wide pronotum (clade 3).

#### VESTITURE

**Character 5:** Vestiture: consisting of only simple, slender setae (0); additional flattened, subadpressed, silvery setae (1) [fig. 4A–F]. The presence of two types of setae, slender/suberect and flattened/subadpressed, is a synapomorphy of the *Polyozus* group. The three outgroup species chosen for this analysis represent the plesiomorphic condition of simple/suberect setae only. However, a mixture of simple and flattened setae occurs in numerous taxa of Phylinae (e.g., *Adenostomocoris*, *Arctostaphylocoris*, *Guentherocoris* [Schuh and Schwartz, 2004]), and future generic level analysis of Phylini might result in a reconsideration of this character.

**Character 6:** Ridges of flattened setae: oblique (0) [fig. 4B, C]; parallel (1) [fig. 4A]. Parallel orientation of the ridges on the flattened setae is a synapomorphic character for *Ancoraphylus* as currently defined.

#### MALE GENITALIA

**Character 7:** Ornamentation on pygophore, dorsolateral tubercle: absent (0) [fig. 6C, F]; small (1) [fig. 6A]; large (2).

Among species of the *Polyozus* group, ornamentation of the pygophore is restricted to the genus *Ancoraphylus*, where a small tubercle evolved in clade 5, which developed into the (autapomorphic) large tubercle seen in *A. carolus*. Spines or tubercles on the left side of the pygophore, anterior to the external opening are so far documented for only a few taxa of Phylini (e.g., *Platyscytisca* [Costa and Henry, 1999], *Phymatopsallus* [Schuh, 2006], and *Pygovepres* [Weirauch, 2006]). No indication exists that these taxa are closely related, so multiple evolution of such ornaments in a similar position on the pygophore may have occurred.

**Character 8:** Shape of right paramere: elliptical (0) [fig. 7; *A. auski*]; elongate (1) [fig. 7; *A. arctous*]. A greatly enlarged, almost parallel sided right paramere, with a long, curved apical portion is shared only by the sister taxa *A. arctous* and *A. mariala* (clade 7).

**Character 9:** Shape of tip of right paramere: straight (0) [fig. 7]; notched (1) [fig. 7; e.g., *P. manilla*]. A notched apex of the right paramere is a synapomorphy of *Polyozus*.

**Character 10:** Size of left paramere: of moderate size (0) [figs. 8 (*E. praegracilis*), 9]; very large (1) [fig. 8; e.g., *A. carolus* or *E. aurum*]. Large left parameres (i.e., also the base is wide) have evolved independently in *Ancoraphylus* (clade 5) and within *Exocarpocoris* (clade 3).

**Character 11:** Dorsal process of left paramere: absent (0) [fig. 8; *Exocarpocoris*]; present on anterolateral margin (1) [fig. 8]; present on posterior margin (2) [fig. 8]. The dorsal process on the lobe of the left paramere, which occurs only in *Ancoraphylus*, evolved according to this analysis in an anterolateral position and then moved to the posterior margin, as seen in *A. auski*.

**Character 12:** Shape of left paramere in dorsal view: moderately elongate, without extended horizontal lobe (0) [figs. 8 (*E. praegracilis*) and 9]; strongly elongate, with large horizontal lobe (1) [fig. 8; e.g., *A. mariala*, *E. aurum*]. The left paramere is not only characterized by its large size in *Ancoraphylus* and *E. aurum* + *E. tantulus*, but it also possesses a distinct, horizontally extended lobe.

TABLE 2  
(Continued)

The discussion is based on the character distribution on the strict consensus of the unweighted analysis (fig. 18)

- Character 13:** Shape of external portion of phallotheca: tubular (0) [fig. 10; *Exocarpocoris* spp.]; irregular and tapering (1) [fig. 10 (*Ancoraphylus* spp.), 11]. The external portion of the phallotheca in the outgroup representatives and in *Exocarpocoris* are tubular, and in *Exocarpocoris* the apex tapers only slightly. *Ancoraphylus* + *Polyozus* share a much more strongly tapering phallotheca, with a wide base.
- Character 14:** Ornamentation of base of anterior surface of phallotheca: smooth (0) [fig. 10; *Exocarpocoris* spp.]; with horizontal flange (1) [fig. 11]; with long spine (2) [fig. 10; *Ancoraphylus* spp.]. A horizontal flange on the base of the anterior surface of the phallotheca is a synapomorphy of *Ancoraphylus* + *Polyozus*. This state is retained within *Ancoraphylus* only in *A. auski*. In the three species contained in clade 6, this horizontal flange is extended into a long spine
- Character 15:** Ornamentation of subapical portion of anterior surface of phallotheca: smooth and not protruding (0) [fig. 11; e.g., *P. bulita*]; with smooth lobe (1) [fig. 11; e.g., *P. kojomup*]; with serrate lobe (2) [fig. 11; e.g., *P. mina*]. A smooth lobe in subapical position on the anterior surface of the phallotheca evolved within *Polyozus* (clade 10), which then became serrate at the base of clade 11. The serrate lobe in the same position in *A. arctous* and *A. mariala* is of independent origin.
- Character 16:** Ornamentation of subapical portion of posterior surface of phallotheca smooth, without lobe (0) [fig. 11; e.g., *P. tridens*]; with serrate lobe (1) [fig. 11; e.g., *P. kuringgal*]. Unambiguous optimization of this character results in 2 independent origins of serrate lobes in a similar position on the posterior surface of the phallotheca (in clades 6 and 11).
- Character 17:** Shape of vesica: S-shaped (0); J-shaped (1) [figs. 12, 13]; C-shaped (2). The vesica is j-shaped in all species of the *Polyozus* group and this character state is synapomorphic for the group. However, this shape also occurs in other genera of Phylini, and an analysis of Phylini on a generic level may find that this character displays high degrees of homoplasy.
- Character 18:** Orientation of secondary gonopore: facing caudad (0) [fig. 12; e.g., *E. aurum*]; left (1) [fig. 12; e.g., *P. fureilla*]. The secondary gonopore in *Exocarpocoris* faces left, whereas it is oriented caudad in *Ancoraphylus* and *Polyozus*. Optimization of this character is ambivalent: Fast optimization treats the caudal orientation in *Exocarpocoris* as apomorphic, the condition in *Ancoraphylus* + *Polyozus* as plesiomorphic. Slow optimization in contrast favors a hypothesis that treats the condition in *Ancoraphylus* + *Polyozus* as apomorphic, with an independent occurrence of the caudal orientation in *Xiphoides* sp., and a plesiomorphic left orientation in *Exocarpocoris*.
- Character 19:** Process arising near secondary gonopore: absent (0); present (1) [figs. 12, 13]. In the present analysis, a process arising close to the secondary gonopore and projecting from the body of the vesica is restricted to the *Polyozus* group. In Phylinae, processes arising from the body of the vesica occur in Pilophorini, e.g., in the genera *Pilophorus* and *Druthmarus* (Schuh, 1984). The different position of these processes in Pilophorini (far removed from the secondary gonopore) makes even primary homology unlikely. Unpublished observation on Australian Phylini shows that representatives of at least one additional assemblage of species possess a large process in caudal position that may arise close to the opening of the secondary gonopore. As the vesica and other features in this group are very distinct from the *Polyozus* group and as their host range seems to be restricted to Proteaceae and Myrtaceae, this group appears not closely related. However, future analysis of a wide range of genera of Phylinae may show that the processes are actually homologous.
- Character 20:** Shape of process arising near secondary gonopore: circular in cross-section (0) [fig. 12; e.g., *P. fureilla*]; flattened (1) [fig. 12; e.g., *E. aurum*]; inapplicable (-). The process arising from the area of the secondary gonopore, a synapomorphy of the *Polyozus* group, occurs in two distinct states within this group. A flattened, strap like process is restricted to *Exocarpocoris* (fast optimization), whereas the process is circular in cross section in *Ancoraphylus* + *Polyozus*.
- Character 21:** Process arising near secondary gonopore: arising from left strap (0) [fig. 12; e.g., *E. aurum*]; close to secondary gonopore (1) [fig. 12; e.g., *P. bulita*]; inapplicable (-). The exact point of origin of the process arising from the area of the secondary gonopore in *Ancoraphylus* + *Polyozus* is caudal and usually on its right side. In *Exocarpocoris* that process arises from a strap like area on the left side of the body of the vesica.
- Character 22:** Dorsal apical process of vesica: absent (0); straight (1); bent at right angle (2) [figs. 12, 13]. The distinctly bent dorsal apical process of the vesica in species of the *Polyozus* group (at right angle to body of vesica) is a synapomorphy for this group. Two of the outgroup species chosen for this analysis, *Opuna annulatus* and *Xiphoides*, possess only one apical process, which is here assumed to be homologous to the ventral process observed in species of the *Polyozus* group (similar position and connection to the body of the vesica). The dorsal process in these species is absent. The dorsal process in *Campylomma* sp. (i.e., the process that arises from the dorsal and left surface of the vesical body; e.g., fig. 1022 in Schuh [1984]) is treated as homoplastic in the present analysis.

TABLE 2  
(Continued)

The discussion is based on the character distribution on the strict consensus of the unweighted analysis (fig. 18)

- Character 23:** Ventral appendage of dorsal apical process of vesica: absent (0); present (1) [fig. 12; e.g., *A. arcatus*]. The dorsal apical process shows an appendage on its (morphologically) ventral surface only in two species of *Ancoraphylus*, *A. arcatus* and *A. mariala*, and this character is a synapomorphy for the two sister species.
- Character 24:** Shape of dorsal apical process of vesica: slender (0) [fig. 13; e.g., *P. mina*]; slender blade-shaped and truncate (1) [fig. 12; *E. praegracilis*]; blade-shaped and tapering (2) [fig. 12; e.g., *P. australianus*]; fan-shaped (3) [fig. 13; *P. kojonup*]; inapplicable (-). A slender dorsal apical process is plesiomorphic within the *Polyozus* group, which is retained in the sister species *E. aurum* + *E. tantulus*, all species of *Ancoraphylus*, and *P. bulita*, *P. furcilla*, *P. tridens*, and *P. mina*. Within *Polyozus*, the dorsal apical process is reduced to a short, fan-shaped appendage in *P. kojonup*, and the process becomes broad and blade-shaped in the species in clade 12, i.e., *P. manilla*, *P. kurringai*, *P. australianus*, and *P. galbanus*.
- Character 25:** Dorsal apical process of vesica: smooth (0); with serration (1) [figs. 12 (*A. mariala*), 13 (*P. galbanus*)]. The dorsal apical process has a smooth surface in the plesiomorphic condition within the *Polyozus* group, with the three independent origins of serrations occurring in *A. mariala*, in *P. kojonup*, and in clade 12, comprising *P. manilla*, *P. kurringai*, and *P. australianus* + *P. galbanus*.
- Character 26:** Dorsal appendage on dorsal apical process of vesica: absent (0); present (1) [fig. 12; e.g., *P. australianus*]. Dorsal appendages occur in several species of *Exocarpocoris* and *Polyozus* and are here treated as homologous. The dorsal appendage was reduced in *E. aurum*, *Ancoraphylus*, and part of *Polyozus*.
- Character 27:** Dorsal appendage on dorsal apical process of vesica: triangular (0) [fig. 13; *P. manilla*]; squarish (1) [fig. 13; e.g., *P. mina*]; inapplicable (-). Presence of a squarish appendage is the plesiomorphic condition within clade 12, with the triangular processes in *P. australianus* and *P. manilla* being of independent origin.
- Character 28:** Shape of process arising near secondary gonopore: short, straight (0) [fig. 12; e.g., *P. bulita*]; short, coiled (1) [fig. 12; e.g., *A. mariala*]; longer, coiled (2) [fig. 12; *E. aurum*]. The shape of the process arising from the secondary gonopore is distinctive and synapomorphic for each of the three genera of the *Polyozus* group, with a long, coiled process in *Exocarpocoris*, a short, coiled process in *Ancoraphylus*, and a short, straight process in *Polyozus*.
- Character 29:** Median apical process of vesica: absent (0); consisting of weakly sclerotized branch with few processes (1) [fig. 13; e.g., *P. kojonup*]; one heavily sclerotized branch (2) [fig. 13; e.g., *P. tridens*]; weakly sclerotized tree (3) [fig. 13; e.g., *P. mina*]. A median apical process, located in between the dorsal and ventral apical processes is restricted to and synapomorphic for the genus *Polyozus*. The character optimization in this analysis implies that the process evolved as a weakly sclerotized tree shaped process, as seen in *P. bulita*, and evolved into the long stemmed processes seen in *P. kojonup* (fig. 13), *P. furcilla* and *P. tridens* (figs. 12, 13).
- Character 30:** Proximal appendage on ventral apical process of vesica: absent (0); present (1) [fig. 12; *A. mariala*]. A proximal appendage on the ventral apical process is restricted to *A. arcatus* + *A. mariala* and is synapomorphic for the sister species.
- Character 31:** Sclerotizations of vesical body and ventral apical process: separated (0) [fig. 12; e.g., *P. furcilla*]; connected (1) [fig. 12; e.g., *P. bulita*]. The sclerotization of the ventral apical process is continuous with the ventral and caudal surface of the vesical body in the outgroup representatives used in this analysis, but also in all species of *Exocarpocoris* and *Ancoraphylus*, and *P. bulita*, and *P. kojonup*. In contrast, the ventral apical process is separated by a membranous area from the sclerotized body of the vesica in the species that are contained in clade 9 of *Polyozus* and this character is synapomorphic for this group (reversal in *P. kojonup*).
- Character 32:** Orientation of ventral apical process: almost straight (0) [fig. 12; e.g., *E. aurum*]; almost at right angle to body of vesica (1) [fig. 12; e.g., *P. bulita*]. The orientation of the ventral apical process, which arises in almost a right angle to the body of the vesica, is synapomorphic for clade 4, i.e., *Ancoraphylus* + *Polyozus*.
- FEMALE GENITALIA**
- Character 33:** Ornamentation on dorsal labiate plate, paired and sclerotized invaginations with microtrichia: absent (0); present (1) [fig. 14]. The distinctive ornamentation of the posterior dorsal surface of the dorsal labiate plate is a synapomorphy for *Exocarpocoris* + *Ancoraphylus* + *Polyozus*.
- Character 34:** Posterior wall with paramedian paired areas with microtrichia: absent (0); present (1) [fig. 14]. The paired areas beset with microtrichia are synapomorphic for the *Polyozus* group.
- Character 35:** Posterior wall with paired, slightly sclerotized processes beset with microtrichia: absent (0); present (1) [fig. 14]. Paired, paramedian processes in a posterior position on the posterior wall occur in species of the three genera of the *Polyozus* group, even if in slightly different formation, with the processes in *Exocarpocoris* very elaborate, those in *Ancoraphylus* and *Polyozus* small.

TABLE 2  
(Continued)

The discussion is based on the character distribution on the strict consensus of the unweighted analysis (fig. 18)

#### COLORATION

- Character 36:** General coloration: pale (0); orange, red or dark red (1) [fig. 1]; yellowish, brown, and pale (2) [figs. 1, 2]. Unambiguous optimization of general coloration does not resolve if the orange/red coloration seen in all species of *Ancoraphylus*, or yellowish, brown and pale coloration, as seen in *Exocarpocoris* and in *Polyozus* are plesiomorphic for the *Polyozus* group. Fast optimization favors a plesiomorphic yellowish, brown and pale coloration for the *Polyozus* group, with the red and orange coloration of *Ancoraphylus* spp. as a synapomorphy of clade 5, slow optimization treats red and coloration as plesiomorphic, with two independent origins of yellowish, brown, and pale in *Exocarpocoris* and *Polyozus*.
- Character 37:** Coloration of first antennal segment: pale (0); pale, with subbasal dark ring (1); pale, with subbasal and subapical dark ring (2); pale, with subapical dark ring (3); red or dark colored (4). This analysis implies that a pale first antennal segment is plesiomorphic for the *Polyozus* group and is retained as such in *Exocarpocoris* (clade 2). The subbasal ring is a synapomorphy for *Ancoraphylus* + *Polyozus*.
- Character 38:** Coloration of femora: uniformly pale or very few small spots (0); heavily spotted with dark spots (1). Largely pale femora are here treated as the plesiomorphic condition in the *Polyozus* group, which is retained in all species of *Exocarpocoris*. Numerous spots on the femora evolved in clade 4, and they represent a synapomorphy for *Ancoraphylus* + *Polyozus*. The unspotted femora in *P. kojonup* is due to a reduction of the spots.
- Character 39:** Distal part of embolium and exocorium, dark U-shaped mark: absent (0); present (1) [fig. 1]. The distinctive U-shaped dark mark on the distal portion of the hemelytra is a synapomorphy for the three species of *Exocarpocoris*.
- Character 40:** Coloration of cuneus: at most proximal margin white (0); entirely white (1). Within the *Polyozus* group, a largely white cuneus is restricted to the species of *Exocarpocoris*, and this character is a synapomorphy of *Exocarpocoris*.
- Character 41:** Coloration of membrane: clear (0); with suffused patches (1); marmorate (2). Wing coloration is ambiguous: fast optimization treats a membrane with suffused patches as synapomorphy of the *Polyozus* group, with multiple origins of a marmorate membrane within the group.
- Character 42:** Coloration of dorsal portion of pygophore: pale (0); dark (1). The combination of a pale pygophore with dark dorsal surface is restricted to *P. australianus* and *P. galbanus* and is synapomorphic for the sister species.
- Character 43:** Host plants: *Hibbertia* [Dilleniaceae] (0); unknown (1); *Acacia* [Fabaceae, Mimosoideae] (2); *Exocarpos* [Santalaceae] (3); *Senna* [Fabaceae, Caesalpinioideae] (4); *Jacksonia* [Fabaceae, Papilionoideae] (5); *Grevillea* [Proteaceae] (6); *Notelaea* [Oleaceae] (7). Unambiguous optimization does not resolve the host plant at the base of the *Polyozus* group, but indicates that clade 2, *Exocarpocoris*, evolved on the genus *Exocarpos* (Santalaceae) and that clade 4 evolved on *Acacia* (Fabaceae, Mimosoideae). Fast optimization indicates that the *Polyozus* group evolved on *Acacia*. Within the genus *Polyozus*, *P. kojonup* spread to the genus *Jacksonia* (also Fabaceae, but subfamily Papilionoideae) and *P. fuscilla* and *P. tridens* occur on *Senna* (Fabaceae, but in the probably not monophyletic subfamily "Caesalpinioideae"). In addition, *P. manilla* apparently spread to *Notelaea microcarpa* (Oleaceae) and *P. kurringai* to *Grevillea buxifolium* (Proteaceae).

#### *Ancoraphylus*, new genus

figures 1, 3–8, 10, 12, 14, 15, 18–20

TYPE SPECIES: *Ancoraphylus arctous*, new species.

DIAGNOSIS: Recognized among Phylini by the small size, elongate ovoid body, orange, red, and/or cream coloration, mixture of suberect dark and subadpressed, flattened, silvery setae, and characters of the male genitalia, that is, the ornamentation of the pygophore, the shape and armature of the left paramere, absence of a median, apical process on the vesica, and greater length and curva-

ture of the process arising close to the secondary gonopore. Among Australian Phylini, similar to *Polyozus* Eyles and Schuh and *Exocarpocoris*, n.gen. with respect to characters of the male (e.g., shape of vesica, presence of process arising close to secondary gonopore) and female genitalia (ornamentation of posterior wall and dorsal labiate plate) and the type of vestiture, but distinguished by size, shape, and coloration as well as the characters of the male genitalia enumerated above.

DESCRIPTION: *Male*: Macropterous, small to medium-sized (2.77–3.57), elongate ovoid.



**COLORATION** (figs. 1, 2): General coloration either uniformly pale orange, red and orange with cream marks, or cream and orange with red spots and patches, membrane infusate with pale marks, veins pale. **Head**: Orange or pale orange, sometimes with base of clypeus infusate and paired longitudinal stripes on clypeus, maxillary plate, and gena reddish orange or with central spot on mandibular plate, clypeus, antennal fossa, parts of gena and gula cream. Antennal segments pale, first segment sometimes with one or two brown rings, segments 3 and 4 infusate or weakly so. Labium pale, infusate toward apex or with apical segment dark brown. **Thorax**: Pronotum, mesonotum, and scutellum either uniformly pale orange, or anterior lobe of pronotum orange, posterior lobe orange, red, and cream, mesonotum and scutellum mostly orange or red, with tip of scutellum cream. Pleura either uniformly orange or propleuron cream with large central orange spot, mesopleuron mostly orange or orange and cream, metapleuron orange or orange and cream, evaporatorium cream or cream and orange. **Legs**: Pale orange, tarsi slightly infusate, small dark spots on pro- and mesofemur limited to distal third or distal half, spots larger on metafemur, extending almost to base of femur or covering entire femur, tibial spines dark, with dark bases. **Hemelytra**: Orange with pale areas and brown suffusion, largely red with cream areas, or cream with red spots and patches. **Abdomen**: Venter either uniformly orange or generally cream with lateral orange spots or stripes, pygophore usually orange. **SURFACE AND VESTITURE** (fig. 4A): Dorsum and hemelytra weakly shining, vestiture comprising rather dense cover of dark suberect simple setae and flattened, subadpressed silvery setae with parallel ridges. **STRUCTURE**: **Head**: small, broadly triangular in dorsal view, vertex almost twice as wide as eye, anteocular area short and gently sloping in lateral view, clypeus slightly produced. Eyes of moderate size (fig. 3A), extending over three-fourths of height of head, weakly emarginate at anterior margin to accommodate antennal fossa, posterolateral margin contiguous with anterolateral margin of pronotum. Antennal fossa adjacent to eye. Antennal segment 1 slender

and short, slightly surpassing apex of head, segment 2 of moderate length and slender, diameter nearly uniform over length of segment, segments 3 and 4 slender. Labium slender, apex reaching base of mesocoxa, surpassing base of mesocoxa, or reaching base of metacoxa. **Thorax**: Pronotum wider than long, anterior margin almost straight, lateral margins gently sloping, posterior margin weakly concave, anterior and posterior lobes and calli on anterior lobe weakly demarcated, scutellum equilateral. **Legs**: Slender and moderately long. Claws (fig. 5A) slender and moderately long, pulvilli extending over little more than basal half of claw, parempodia setiform. **Hemelytra**: Slightly convex, cuneus triangular or broadly triangular. **Abdomen** (fig. 3A): Ranging from slender to stout, reaching from middle to almost apex of cuneus. **GENITALIA**: **Pygophore** (fig. 6A): Of moderate size or large, slender or moderately stout, occupying from one-third to almost half of abdomen, with small tubercle or large spine on left side anterior to opening. **Parameres**: Right paramere (figs. 6A, B, 7) either of moderate size, moderately broad, and lanceolate with straight, acute, short tip or very large and elongate, with apical fourth strongly bent anteriad, posterodistal surface either smooth or with small hook-shaped process; left paramere (figs. 6A, B, 8) large, body elongate rectangular, elongate ovate, or almost triangular in dorsal view, with either lateral margin extended into distinct process or with process on margin of posterior rim anterior process of moderate length, curved in dorsal view or forming right angle with body of paramere, posterior process long and slender or moderately stout, apex truncate, tapering or knob-shaped in lateral view, bent ventrad in lateral view. **Phallosome** (fig. 10): Of phylline type, of moderate size, external portion curved and irregular, with or without basal, dorsal process, shallow flanges on the dorsal side, with or without shallow flange with irregular margin on ventral side, opening ventral, ovate. **Vesica** (fig. 12): J-shaped, of moderate size, with dorsal and ventral apical processes forming anchor-shaped apex; dorsal apical process slender and elongate, with or without elongate triangular process on dorsal surface; ventral apical process long and

slender, with or without basal process, connected to ventral sclerotized strap of vesica; secondary gonopore at about midpoint of vesica, facing caudad, with slender process of moderate length arising from proximal margin of secondary gonopore, circular in cross section and often twisted or curled.

**Female:** Similar to male in coloration, size, and body shape; very limited sexual dimorphism. For details of female genitalia, see figure 14. All species with posterior wall with fields of spicules and paired posterior processes, and dorsal labiate plate with paired areas with microtrichia.

**ETYMOLOGY:** Named for the anchor-shaped vesica, after the Latin noun “ancora(e)” (f.) meaning anchor, combined with the generic name *Phylus* to emphasize its systematic position within Miridae; masculine.

**Host:** The three species of *Ancoraphylus*, for which host plants are known, occur on species of the genus *Acacia* (Fabaceae, Mimosoideae).

**DISCUSSION:** *Ancoraphylus* is set apart from the two other genera in the *Polyozus* group by the presence of a tubercle or spine on the pygophore, a feature otherwise known in some probably not closely related North American taxa, such as *Phymatopsallus* Knight. Please refer to discussion of the cladistic analysis for detailed information on other characters.

#### KEY TO SPECIES OF *ANCORAPHYLUS*

1. Orange (fig. 1), right paramere very large and elongate (fig. 7) . . . . . ***A. arctous*, n.sp.**
  - Red, red and orange, or cream and red (fig. 1), right paramere large and elongate or of moderate size and lanceolate (fig. 7) . . . . . 2
2. Mostly cream with red spots and patches, right paramere large and elongate, left paramere with large erect process on lateral margin (figs. 1, 7, 8) . . . . . ***A. mariala*, n.sp.**
  - Red and orange, right paramere of moderate size and lanceolate, left paramere with or without large erect process on lateral margin (figs. 1, 7, 8) . . . . . 3
3. Left paramere with large erect process on lateral margin, pygophore with large spine on pygophore (fig. 8) . . . . . ***A. carolus*, n.sp.**
  - Left paramere without large erect process on lateral margin, pygophore with small tubercle (fig. 8) . . . . . ***A. auski*, n. sp.**

#### *Ancoraphylus arctous*, new species figures 1, 3–8, 10, 14, 15, 18–20

**HOLOTYPE:** AUSTRALIA: Western Australia: Pilbara Dist., Hillside-Marble Bar Rd, 66.1 km SW of Marble Bar, 21.51928°S 119.3805°E, 226 m, 29 May 1999, G. Cassis, R. Silveira, 1 ♂ (AMNH\_PBI 00087358) (WAMP).

**DIAGNOSIS:** Distinguished from other species of *Ancoraphylus* by the uniform pale orange coloration, and characters of the male genitalia, most notably the shape of right and left parameres (figs. 7, 8), and the vesica with dorsal apical process with elongate triangular process on dorsal surface (fig. 12), ventral apical process with basal process. Shape of elongate and apically bent right paramere only shared with *A. mariala*.

**DESCRIPTION:** *Male:* Macropterous, small, elongate ovoid; total length 2.84–3.17, length apex clypeus–cuneal fracture 1.98–2.07, width across pronotum 0.90–1.00. **COLORATION** (fig. 1): General coloration pale orange, with pale cuneus, membrane dark with pale veins and some clear areas. **Head:** Head pale orange, fasciae indistinct. Antennal segments pale, segments 3 and 4 infusate. Labium pale, infusate toward apex. **Thorax:** Pronotum, mesonotum, and scutellum pale orange; pleura orange or pale orange. **Legs:** Small dark spots on fore and middle femora limited to distal third, extending toward base on hindfemur. **Hemelytra:** Orange or pale orange, cuneus lighter orange with anterior margin with crescent-shaped pale area, distal and posterior margin of embolium suffused with brown, membrane light brown with two white patches on anterior margin of hemelytron distal to apex of cuneus and one mark distal to apex of posterior cell, veins white. **Abdomen:** Including pygophore uniformly pale orange. **STRUCTURE:** **Head:** Labium reaching metacoxa. **Thorax:** Pronotum wider than long; evaporatory area of metathoracic gland as in figure 3B. **Hemelytra:** Cuneus broadly triangular. **Abdomen:** Slender, almost reaching apex of cuneus. **GENITALIA:** **Pygophore:** Of moderate size, slender, taking up about one-third of abdomen, with small tubercle on left side anterior to opening of pygophore. **Parameres:** Right paramere (figs. 6A, B, 7) very large and elongate, with apical fourth

strongly bent antieriad, posterodistal surface with small hooklike process; left paramere (figs. 6A, B, 8) large, anterior process of moderate length, curved in dorsal view, posterior process long and slender, truncate in lateral view, strongly bent ventrad in lateral view, paramere body elongate rectangular in dorsal view, with anterolateral corner extended into distinct process. *Phallotheca* (fig. 10): With basal, dorsal process, and with shallow flange with irregular margin on ventral side. *Vesica* (fig. 12): Dorsal apical process with elongate, triangular process on dorsal surface; ventral apical process with basal process.

*Female*: Similar to male in coloration and of about same size, slightly stouter. Total length 2.77–3.11, length apex clypeus–cuneal fracture 1.87–2.07, width across pronotum 0.94–1.00. *Genitalia* (fig. 14): Vestibulum not distinctly sclerotized, sclerotized rings quadrate, small, set far from each other, bursa copulatrix posterior to median oviduct with median fold and paired invaginations beset with small spicules, posterior wall with asymmetrical sclerotizations, with two pairs of processes, posterior pair small and with acute apex, beset with spicules.

**ETYMOLOGY**: Named for its relatively northern distribution in the Northern Territory and Western Australia, after the Latin adjective “arctous, -a, um”, meaning northern.

**HOST**: Unknown.

**DISTRIBUTION**: Known from two collecting sites in the Pilbara region of Western Australia and southern Northern Territory (fig. 15).

**DISCUSSION**: *Ancoraphylus arctous* is set apart from the three other species of the genus *Ancoraphylus* by the pale orange coloration. In the present analysis it is treated as the sister species of *A. mariala* (figs. 18, 19) since the two species share the unusual shape of the right paramere and some structural detail of the vesica (fig. 7).

**PARATYPES**: **AUSTRALIA: Northern Territory**: 15 miles W of Pine Hill, 22.38514°S 133.05447°E, 18 Feb 1966, J.A. Grant, 7♂ (AMNH\_PBI 00173837–AMNH\_PBI 00173843), 3♀ (AMNH\_PBI 00173844–00173846) (BMNH). **Western Australia**: Pilbara Dist., Hillside-Marble Bar Rd, 66.1 km SW of Marble Bar, 21.51928°S 119.3805°E,

226 m, 29 May 1999, G. Cassis, R. Silveira, 13♂ (AMNH\_PBI 00087550, AMNH\_PBI 00087678–00087687, AMNH\_PBI 00088323, AMNH\_PBI 00088329), 14♀ (AMNH\_PBI 00087359, AMNH\_PBI 00087695–00087700, AMNH\_PBI 00088339, AMNH\_PBI 00088340, AMNH\_PBI 00088350, AMNH\_PBI 00088357–00088360), 1 immature (AMNH\_PBI 00087692) (AM), 4♂ (AMNH\_PBI 00087674–00087677), 2♀ (AMNH\_PBI 00087693, AMNH\_PBI 00087694) (AMNH). 1♂ (AMNH\_PBI 00088336), 1♀ (AMNH\_PBI 00088346) (CNC). 1♂ (AMNH\_PBI 00088328), 1♀ (AMNH\_PBI 00088345) (USNM). 15♂ (AMNH\_PBI 00087688–00087691, AMNH\_PBI 00088324–00088327, AMNH\_PBI 00088330, AMNH\_PBI 00088331, AMNH\_PBI 00088333–00088335, AMNH\_PBI 00088337, AMNH\_PBI 00088338), 12♀ (AMNH\_PBI 00088341–00088344, AMNH\_PBI 00088347, AMNH\_PBI 00088348, AMNH\_PBI 00088351–00088356) (WAMP). 1♂ (AMNH\_PBI 00088332), 1♀ (AMNH\_PBI 00088349) (ZISP).

*Ancoraphylus auski*, new species  
figures 1, 3–8, 10, 14, 15, 18–20

**HOLOTYPE**: **AUSTRALIA: Northern Territory**: 184 km E of Stuart Highway on Lasseter Highway, 25.23334°S 131.5703°E, 510 m, 31 Oct 2001, Cassis, Schuh, Schwartz, Silveira, Wall, *Acacia* cf. *brachystachya* Benth. (Fabaceae) NSW 666270, 1♂ (AMNH\_PBI 00098022) (AM).

**DIAGNOSIS**: Distinguished from other species of *Ancoraphylus* by the mostly red and orange coloration, with this being shared only with *A. carolus*, and characters of the male genitalia, most notably the shape of right and left parameres, and the vesica without process on the dorsal and ventral apical process. Closest in external appearance and shape of vesica to *A. carolus*, but distinguished by the small tubercle on the pygophore (large spine in *A. carolus*), absence of a large process on the lateral margin of the left paramere (large process in *A. carolus*), and slightly smaller size of the vesica in *A. auski* than in *A. carolus*.

**DESCRIPTION**: *Male*: Macropterous, small, elongate ovoid; total length 2.77–3.57; length apex clypeus–cuneal fracture 1.80–2.23, width across pronotum 0.93–1.09. **COLORATION**

(fig. 1): General coloration red and cream, head pale orange or cream, pronotum orange and cream with large red marks, scutellum red with cream tip, hemelytron red with base, claval suture, and base of cuneus cream, membrane infusate with pale veins. Head: Pale orange, fasciae indistinct, sometimes with base of clypeus infusate and paired longitudinal stripes on clypeus, maxillary plate, and gena reddish orange. Antennal segments pale, first segment usually with two brown rings, segments 3 and 4 infusate. Labium pale, apical segment dark brown. Thorax: Pronotum with anterior lobe pale orange or orange, posterior lobe cream with large submedian orange marks, mesonotum red or orange, scutellum red or orange with cream tip; propleuron cream with large central orange spot, mesopleuron mostly orange, metapleuron orange, evaporatorium cream. Legs: Small dark spots on pro- and mesofemur limited to distal half, spots larger on metafemur, covering entire femur. Hemelytra: Red, with base, costal margin, line along claval suture, proximal and anterior part of cuneus cream, membrane light brown with two indistinct pale patches on anterior margin of hemelytron distal to apex of cuneus and one mark distal to apex of posterior cell, veins pale. Abdomen: Including pygophore either uniformly pale orange or cream with lateral reddish orange marks on segments 2–8. STRUCTURE: Head: Labium reaching mesocoxa. Thorax: Pronotum slightly wider than long. Hemelytra: Cuneus triangular. Abdomen: Slender, reaching middle of cuneus. GENITALIA: Pygophore: Large, moderately stout, taking up almost half of abdomen, with small tubercle on left side anterior to opening of pygophore. Parameres: Right paramere (fig. 7) of moderate size, moderately broad, and lanceolate with straight, acute, short tip; left paramere (fig. 8) large, anterior process of moderate length, curved in dorsal view, posterior process long and very slender, strongly bent ventrad in lateral view, paramere body elongate ovate in dorsal view, with process on margin of posterior rim. Phallotheca (fig. 10): Without basal, dorsal process and without shallow flange with irregular margin on ventral side. Vesica (fig. 12): Apical pro-

cess without elongate triangular process on dorsal surface; ventral apical process without basal process.

Female: Size and coloration similar to male. Total length 2.94–3.26, length apex clypeus–cuneal fracture 1.91–2.14, width across pronotum 0.97–1.13.

ETYMOLOGY: Named for the type locality.

HOST (appendix 1): Recorded on *Acacia* cf. *brachystachya* Benth. (Fabaceae, Mimosoideae).

DISTRIBUTION: Known from the Pilbara region in Western Australia and one locality in the Northern Territory (fig. 15).

DISCUSSION: In the cladistic analysis (figs. 18, 19) *Ancorophylus auski* has an ambivalent position as either the sister species of the remaining species of *Ancorophylus* (fig. 19) or the sister species to *A. arctous* + *A. mariala* (fig. 18).

PARATYPES: **AUSTRALIA: Northern Territory**: 184 km E of Stuart Highway on Lasseter Highway, 25.23334°S 131.5703°E, 510 m, 31 Oct 2001, Cassis, Schuh, Schwartz, Silveira, Wall, *Acacia* cf. *brachystachya* Benth. (Fabaceae) NSW 666270, 2♂ (AMNH\_PBI 00098026, AMNH\_PBI 00139426), 3♀ (AMNH\_PBI 00098027, AMNH\_PBI 00098030, AMNH\_PBI 00098031) (AMNH). **Western Australia**: Pilbara Dist., 28.3 km S of Auski Roadhouse on the Great Northern Highway, 22.61611°S 118.7042°E, 700 m, 31 May 1999, G. Cassis, R. Silveira, 4♂ (AMNH\_PBI 00087354, AMNH\_PBI 00088379–00088381), 3♀ (AMNH\_PBI 00088384, AMNH\_PBI 00088385, AMNH\_PBI 00088387) (AM). 4♂ (AMNH\_PBI 00088374–00088377), 2♀ (AMNH\_PBI 00087355, AMNH\_PBI 00088383) (WAMP).

OTHER SPECIMENS EXAMINED: **AUSTRALIA: Western Australia**: Pilbara Dist., 28.3 km S of Auski Roadhouse on the Great Northern Highway, 22.61611°S 118.7042°E, 700 m, 31 May 1999, G. Cassis, R. Silveira, 1 immature (AMNH\_PBI 00088382) (AM).

*Ancorophylus carolus*, new species  
figures 1, 3–8, 10, 14, 15, 18–20

HOLOTYPE: **AUSTRALIA: Queensland**: 14.2 km E of Charleville, 26.42171°S 146.3756°E, 375 m, 31 Oct 1998, Schuh, Cassis,

Silveira, *Acacia aneura* var. *latifolia* F. Muell. ex Benth. (Fabaceae), det. Royal Bot Gard. NSW 427682, 1♂ (AMNH\_PBI 00088361) (AM).

**DIAGNOSIS:** Distinguished from other species of *Ancoraphylus* by the mostly red and orange coloration, which is only shared with *A. auski*, and characters of the male genitalia, most notably the shape of right and left parameres, and the vesica without process on the dorsal and ventral apical process. Closest in external appearance and shape of the vesica to *A. auski*, but distinguished by the large spine on the pygophore (small tubercle in *A. auski*), the large process on the lateral margin of the left paramere (absent in *A. auski*), and slightly larger size of the vesica in *A. carolus* than in *A. auski*.

**DESCRIPTION:** *Male:* Macropterous, small, elongate ovoid; total length 2.79–2.94; length apex clypeus–cuneal fracture 1.78–1.96, width across pronotum 0.88–0.98. **COLORATION** (fig. 1): General coloration red, orange, and cream, with head and thorax dorsally mostly orange, hemelytron red with base, line along claval suture, and slim crescent-shaped area on cuneal margin cream, membrane slightly infusate with pale area distal to anterior membrane cell, veins pale. **Head:** Orange, with central spot on mandibular plate, clypeus, antennal fossa, parts of gena and gula cream. Antennal segments pale, first segment usually with pale brown, subbasal ring, segments 3 and 4 weakly infusate. Labium pale, infusate toward apex. **Thorax:** Pronotum with anterior lobe orange, posterior lobe orange, posterior margin with median and lateral cream patches, mesonotum orange, scutellum orange with cream tip; propleuron cream with large central orange spot, mesopleuron orange, metapleuron orange, evaporatorium orange and cream. **Legs:** Small dark reddish spots on pro- and mesofemur limited to distal half, spots larger on metafemur, extending to almost base of femur. **Hemelytra:** Red, with base lighter or cream, line along claval suture and proximal, crescent-shaped area of cuneus cream, membrane slightly infusate, with pale area distal to anterior membrane cell, veins pale. **Abdomen:** Cream with lateral, transverse, orange stripes, sometimes segment 2 suffused

with green, pygophore orange, process slightly darker. **STRUCTURE:** **Head:** Labium surpassing base of mesocoxa. **Thorax:** Pronotum slightly wider than long. **Hemelytra:** Cuneus broadly triangular. **Abdomen:** Relatively slender, reaching middle of cuneus. **GENITALIA:** **Pygophore:** Relatively large, stout, taking up almost half of abdomen, with large spine on left side anterior to opening of pygophore. **Parameres:** Right paramere (fig. 7) of moderate size, moderately broad, and lanceolate with straight, acute, short tip; left paramere (fig. 8) large, anterior process short, curved in dorsal view, posterior process long and slender, with knob-shaped apex in lateral view, very strongly bent ventrad in lateral view, paramere body almost triangular in dorsal view, with large erect process on lateral margin. **Phallosome** (fig. 10): With basal, dorsal process and without shallow flange with irregular margin on ventral side. **Vesica** (fig. 12): Apical process without elongate triangular process on dorsal surface; ventral apical process without basal process.

*Female:* Coloration similar to male, sometimes slightly lighter, of same size as male. Total length 2.69–2.88, length apex clypeus–cuneal fracture 1.69–1.95, width across pronotum 0.88–1.00.

**ETYMOLOGY:** Named for the type locality Charleville, as a Latinized adjective.

**Host** (appendix 1): Recorded from *Acacia aneura* F. Muell. ex Benth. (Fabaceae, Mimosoideae).

**DISTRIBUTION:** Known from one collecting event in central Queensland (fig. 15). Given the wide distribution of its host *A. aneura* in the interior of Australia (as shown in the AVH database), a wider distribution would also be expected for *Ancoraphylus carolus*.

**DISCUSSION:** *Ancoraphylus carolus* is treated as the sister species to *A. arctous* and *A. mariala* in the analysis conducted using Pee-Wee (fig. 19) because of the large basal spine on the phallosome. Its position is reversed with *A. auski* in the unweighted analysis, where *A. carolus* appears as the sister species of the remaining species of *Ancoraphylus*.

**PARATYPES:** **AUSTRALIA:** **Queensland:** 14.2 km E of Charleville, 26.42171°S 146.3756°E, 375 m, 31 Oct 1998, Schuh, Cassis,

Silveira, *Acacia aneura* var. *latifolia* F. Muell. ex Benth. (Fabaceae), det. Royal Bot Gard. NSW 427682, 2♂ (AMNH\_PBI 00087481, AMNH\_PBI 00088362), 3♀ (AMNH\_PBI 00088363–00088365) (AM). *Acacia aneura* var. *latifolia* F. Muell. ex Benth. (Fabaceae), det. Royal Bot Gard. NSW 427682, 1♂ (AMNH\_PBI 00087273), 1♀ (AMNH\_PBI 00087274) (AMNH).

*Ancorophylus mariala*, new species  
figures 1, 3–8, 10, 14, 15, 18–20

**HOLOTYPE:** **AUSTRALIA:** **Queensland:** 143 km WNW of Charleville, Mariala National Park, 25.99111°S 145.00138°E, 430 m, 01 Nov 1998, Schuh, Cassis, Silveira, *Acacia stowardii* Maiden (Fabaceae), det. Royal Bot Gard. NSW 427683, 1♂ (AMNH\_PBI 00130512) (AM).

**DIAGNOSIS:** Distinguished from other species of *Ancorophylus* by the predominantly cream coloration with red spots and patches, and characters of the male genitalia, most notably the shape of right and left parameres, and the vesica with dorsal apical process with elongate triangular process on dorsal surface, ventral apical process with basal process.

**DESCRIPTION:** *Male:* Macropterous, small, elongate ovoid; total length 2.84–3.17, length apex clypeus–cuneal fracture 1.98–2.07, width across pronotum 0.90–1.00. **COLORATION** (fig. 1): General coloration cream and orange, with red spots and patches, membrane slightly infusate with pale area distal to anterior membrane cell, veins pale. **Head:** Orange, with central spot on mandibular plate, clypeus, antennal fossa, parts of gena and gula cream. Antennal segments pale, first segment usually with pale brown, subbasal ring, segments 3 and 4 weakly infusate. Labium pale, apical segment dark brown. **Thorax:** Pronotum with anterior lobe orange, posterior lobe patchy cream and red, mesonotum orange with some cream areas, scutellum pale orange with cream tip; propleuron cream with large central dark orange spot, mesopleuron orange and cream dorsal area, metapleuron including evaporatorium orange and cream. **Legs:** Small dark reddish spots on pro- and mesofemur limited to distal half, spots larger on metafemur, extending to almost base of femur. *Hemelytra:*

Cream, with irregular red spots and patches, denser on exocorium adjacent to claval suture than elsewhere, cuneus cream with large, red central spot, membrane slightly infusate, with pale area distal to anterior membrane cell, veins pale. **Abdomen:** With segments 2–8 cream with lateral orange patches, pygophore orange. **STRUCTURE:** **Head:** Labium reaching metacoxa. **Thorax:** Pronotum wider than long. *Hemelytra:* Cuneus triangular. **Abdomen:** Stout, reaching middle of cuneus. **GENITALIA:** **Pygophore:** Large, stout, occupying almost half of abdomen, with small tubercle on left side anterior to opening. **Parameres:** Right paramere (fig. 7) very large and elongate, with apical fourth strongly bent anteriorly, posterodistal surface smooth; left paramere (fig. 8) large, anterior process short, almost at right angle to body of paramere in dorsal view, posterior process relatively long and moderately stout, with truncate apex in lateral view, bent ventrad in lateral view, paramere body elongate rectangular in dorsal view, with large erect process on lateral margin. **Phallosheca** (fig. 10): With basal, dorsal process and with shallow flange with irregular margin on ventral side. **Vesica** (fig. 12): Dorsal apical process with elongate triangular process on dorsal surface; ventral apical process with basal process.

*Female:* Size and coloration similar to male. Total length 2.77–3.11, length apex clypeus–cuneal fracture 1.87–2.07, width across pronotum 0.94–1.00.

**ETYMOLOGY:** Named for the type locality.

**Host** (appendix 1): This species was recorded from *Acacia stowardii* Maiden (Fabaceae, Mimosoideae).

**DISTRIBUTION:** Known from two localities in central Queensland, Australia (fig. 15).

**DISCUSSION:** *Ancorophylus mariala* is here treated as the sister species of *A. arctous*, due to, among other characters, the structure of the greatly enlarged right paramere.

**PARATYPES:** **AUSTRALIA:** **Queensland:** 143 km WNW of Charleville, Mariala National Park, 25.99111°S 145.00138°E, 430 m, 01 Nov 1998, Schuh, Cassis, Silveira, *Acacia stowardii* Maiden (Fabaceae), det. Royal Bot Gard. NSW 427683, 4♂ (AMNH\_PBI 00087125, AMNH\_PBI 00088366–00088368), 6♀ (AMNH\_PBI 00087126, AMNH\_PBI

00088369–00088373) (AM). *Acacia stowardii* Maiden (Fabaceae), det. Royal Bot Gard. NSW 427683, 5♂ (AMNH\_PBI 00130513–00130517), 3♀ (AMNH\_PBI 00130518–00130520) (AMNH). 146 km NW of Quilpie, 25.8587°S 143.3993°E, 230 m, 03 Nov 1998, Schuh, Cassis, Silveira, *Acacia stowardii* Maiden (Fabaceae), det. Royal Bot Gard. NSW 427684, 2♀ (AMNH\_PBI 00130221, AMNH\_PBI 00130222) (AMNH).

***Exocarpocoris*, new genus**

figures 1, 3–8, 10, 12, 14, 16, 18–20

TYPE SPECIES: *Exocarpocoris tantulus*, new species.

DIAGNOSIS: Recognized among Phylini by the small to moderate size (2.07–2.94), ovoid and stout or elongate ovoid body, combination of cream, yellow, and brown coloration or a yellow and brown color pattern, with distal part of corium and clavus brown or dark brown, resulting in crescent-shaped dark mark, mixture of suberect dark and subadpressed, flattened, silvery setae, and characters of the male genitalia, that is, the J-shaped, large vesica, with dorsal apical process at right angle to body of vesica and ventral apical almost straight, dorsal apical process either slender, elongate, and tapering or short and truncate, with or without squarish or triangular process, ventral apical process slender, connected to ventral sclerotized strap of vesica, secondary gonopore just distal to middle of vesica, facing caudad and slightly left, process arising from proximal margin of secondary gonopore varying from moderate length to very long, laterally flattened and broad, bent or coiled, sometimes coiling around ventral apical process, its broad base arising just ventral to secondary gonopore. Among Australian Phylini, similar to *Polyozus* and *Ancoraphylus*, with respect to the type of vestiture, and characters of the male (e.g., shape of vesica, presence of process arising close to secondary gonopore) and female genitalia (ornamentation of posterior wall and dorsal labiate plate). Distinguished from these genera by the usually yellow, brown, and cream coloration, dark U-shaped mark on the distal part of the corium, the white cuneus, and characters of the male genitalia such as

the flattened and broad process arising from the left strap of the vesica.

DESCRIPTION: *Male*: Macropterous, small, ovoid or elongate ovate, total length 2.40–2.94, length apex clypeus–cuneal fracture 1.49–1.98, width across pronotum 0.92–1.20. COLORATION (fig. 1): General coloration yellow or orange, white, sometimes with brown or light brown suffusion. Head: Yellow or white, mandibular and maxillary plates, gena, and gula often paler than remaining head and with greenish tinge. Antennal segments pale yellowish, gradually infusate toward apex starting apically on segment 2. Labium pale yellow, last segment moderately or strongly infusate. Thorax: Pronotum, mesonotum, and scutellum either yellow or pale yellow, sometimes with whitish marks with green tinge, or whitish with green tinge with orange marks. Pleura yellow, pale yellow, or whitish with orange and green marks, evaporatorium pale yellow or whitish. Legs: Yellow or pale yellow, tibiae distally and tarsi slightly suffused, femora uniformly pale or with few small light brown spots in distal third of all femora or in distal third of meso- and metafemur and in distal half of metafemur, tibial spines dark with dark or pale bases. Hemelytra: Corium including clavus yellow, pale yellow, or whitish, with distal part of corium and clavus brown or suffused with brown, resulting in crescent-shaped mark, cuneus white, membrane brown with white marks and with white veins. Abdomen: Abdomen including pygophore either uniformly yellow or pale yellow with green tinge or whitish with transverse brown and orange bands and pygophore whitish with orange marks. SURFACE AND VESTITURE: Dorsum weakly shining, vestiture comprising dark suberect simple setae and flattened, subadpressed silvery setae, with oblique ridges (fig. 4B). STRUCTURE: Head: Small or of moderate size, broad or very broad, with vertex 1.5–2.0 times as wide as eye, anteocular area short and almost vertical or of moderate length, clypeus slightly, distinctly, or strongly produced. Eye small to moderate (fig. 3C), about one-half to three-fourths of height of head, anterior margin slightly or not emarginate to accommodate antennal fossa, postero-lateral margin contiguous with anterolateral

margin of pronotum. Antennal fossa either removed from anteroventral margin of eye by about diameter of antennal segment 1 or adjacent to fossa. Antennal segment 1 slender and short, ranging from not reaching to slightly surpassing apex of head, segment 2 of moderate length, slender, diameter slightly increasing toward apex, segments 3 and 4 slender, segment 3 longer than segment 4. Labium slender, length variable, apex either only reaching base of mesocoxa or base of metacoxa. **Thorax:** Pronotum wider than long or much wider than long, anterior margin almost straight, lateral margins gently sloping, posterior margin almost straight, anterior and posterior lobes not distinct, calli weakly demarcated, scutellum equilateral; evaporatory area of metathoracic gland as in figure 3D. **Legs:** Either moderately stout and short or slender and moderately long. Claws (fig. 5B) small and slender, with pulvilli almost covering entire ventral surface of claw, or long and slender, with pulvilli covering no more than proximal half, parempodia setiform. **Hemelytra:** Costal margin straight or slightly convex; cuneus broadly triangular. **Abdomen:** Either very stout or slender, reaching to about apex of cuneus. **GENITALIA:** **Pygophore** (figs. 6C): Either very large and broad, taking up about one half of abdomen, or of moderate size taking up about one-third of abdomen. **Parameres:** Right paramere (fig. 7) short and broad or more broadly lanceolate, apex acuminate; left paramere (fig. 6D, E) large or of moderate size, anterior process short and stout, posterior process of moderate length, gradually tapering, straight, or slightly bent ventrad in lateral view, paramere body elongate, extended into more or less distinct, almost horizontal lobe. **Phallosome** (figs. 6D, 10): Of phylline type, large or of moderate size, external portion tubular, only slightly tapering toward blunt apex, smooth or with low flange dorsally on anterior or posterior surface; opening ventral, slitlike. **Vesica** (fig. 12): J-shaped, large or of moderate size, body stout or slender, with long or moderately long dorsal and ventral apical processes forming roughly anchor-shaped apex; dorsal apical process either slender, elongate, and tapering or short and truncate, with or without squarish or triangular process;

ventral apical process slender, connected to ventral sclerotized strap of vesica; secondary gonopore just distal to middle of vesica, facing caudad and slightly left; process arising from proximal margin of secondary gonopore varying from moderate length to very long, laterally flattened and broad, bent or coiled, sometimes coiling around ventral apical process, base of process broad, arising just ventral to secondary gonopore.

**Female:** Limited sexual dimorphism, same coloration and only slightly longer and wider than male. Female genitalia with posterior wall with fields of spicules and paired posterior processes, and dorsal labiate plate with paired areas with microtrichia (fig. 14).

**ETYMOLOGY:** Named for the host plant of the three known species, *Exocarpos* Labill., combined with Greek “korios”, meaning “bug”; masculine.

**HOST:** The three known species breed on *Exocarpos aphyllus* R. Br. (Santalaceae) based on several collecting events.

**DISCUSSION:** Species of this genus appear to be closely associated with their common host plant *Exocarpos aphyllus* (assuming that the few records of *E. aurum* and *E. praegracilis* on *Melaleuca unciniata* are sitting rather than breeding hosts). Even though about 10 species of *Exocarpos* occur in Australia, and some of these were sampled during the Schuh and Cassis collecting trips, *Exocarpocoris* was recorded only from one of these species. *Exocarpocoris aurum* and *E. tantulus* do not only share the same species of host plant and have broadly overlapping distributions, but they are also frequently collected during the same collecting event (i.e., they also have overlapping phenology).

Species of this genus are somewhat greenish in life, but the color is fading when they are killed and dried.

#### KEY TO SPECIES OF *EXOCARPOCORIS*

1. Slender ovoid body, narrow vertex, distinct color pattern of body consisting of cream, yellow, and brown (fig. 1; *E. praegracilis*); vesica with dorsal apical process truncate and process arising from proximal margin of secondary gonopore of moderate length (fig. 12; *E. praegracilis*) ..... *E. praegracilis*, n.sp.

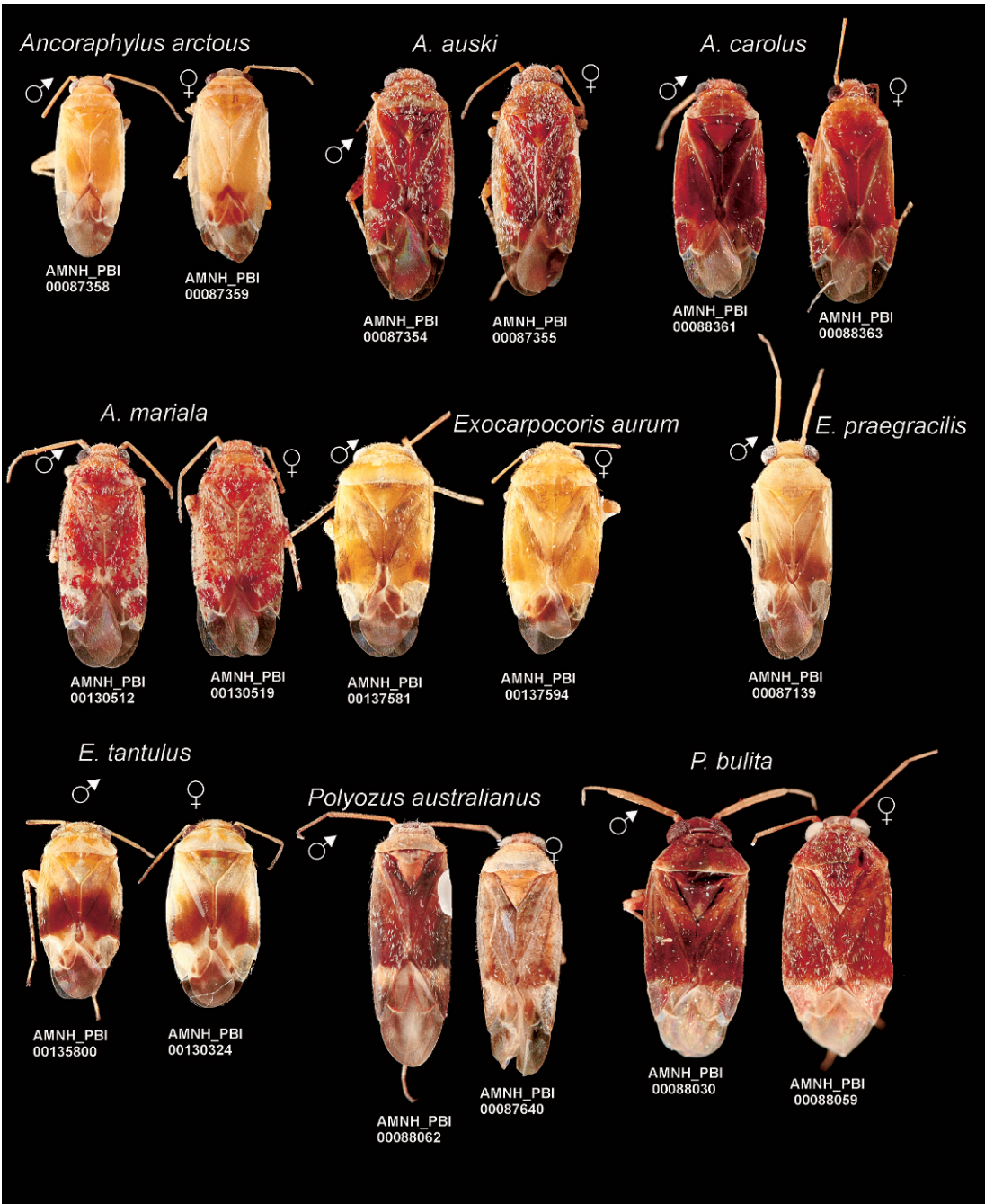


Fig. 1. Habitus photographs of *Ancoraphylus* spp., *Exocarpocoris* spp., and *Polyozus* pp.

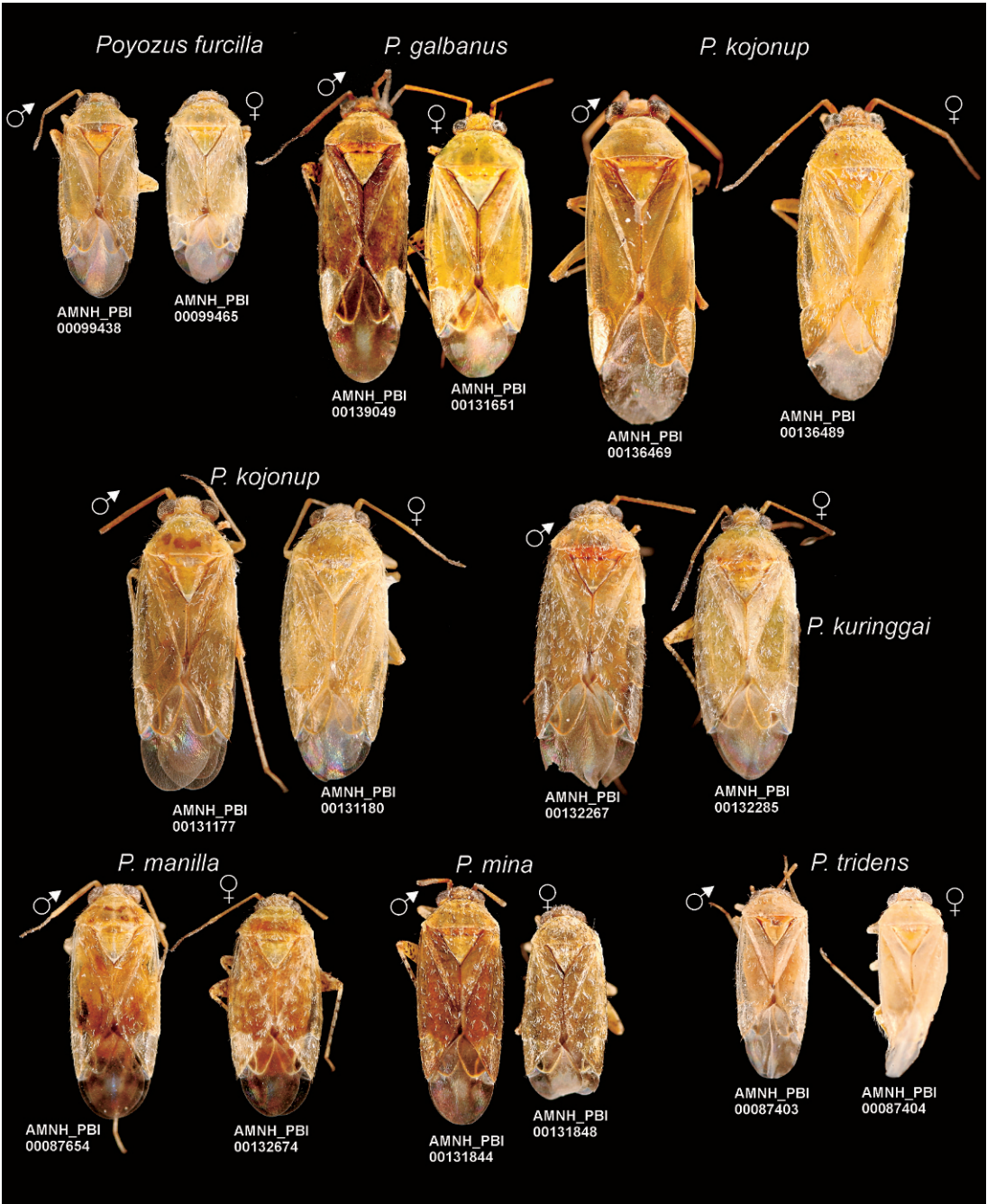


Fig. 2. Habitus photographs of *Polyozus* spp.

- Ovoid body, broad vertex, coloration of body either pale brown and orange, distal area of corium brown, cuneus pale or distinct color pattern consisting of cream, yellow, and brown (fig. 1; *E. aurum*, *E. tantulus*); vesica with dorsal apical process elongate and slender, process arising from proximal margin of secondary gonopore long (fig. 12; *E. aurum*, *E. tantulus*). . . . . 2
- 2. Of moderate size (2.40–2.85), coloration yellow and pale brown (fig. 1; *E. aurum*); vesica with dorsal apical process without dorsal appendage and process arising from area of secondary gonopore very long, but not coiling around the ventral apical process (fig. 12; *E. aurum*) . . . . . *E. aurum*, n.sp.
- Small (2.07–2.37), distinct color pattern consisting of cream, yellow, and brown (fig. 1; *E. tantulus*); vesica with dorsal apical process with dorsal squarish appendage and process arising from area of secondary gonopore very long, often coiling around the ventral apical process (fig. 12; *E. tantulus*) . . . . . *E. tantulus*, n.sp.

***Exocarpocoris aurum***, new species  
 figures 1, 7, 8, 10, 12, 14, 16, 18–20

**HOLOTYPE:** AUSTRALIA: South Australia: 5 km SW of Whyalla, 33.05085°S 137.5004°E, 30 m, 21 Oct 1996, Schuh and Cassis, *Exocarpos aphyllus* R. Br. (Santalaceae), det. PERTH staff 05056209, 1♂ (AMNH\_PBI 00137581) (AM).

**DIAGNOSIS:** Recognized by the moderate size (2.40–2.85), ovoid body, and broad head, pale brown and yellow coloration, distal area of corium brown, cuneus pale, and characters of the male genitalia, that is, the large vesica with anchor-shaped apex with dorsal apical process tubular, coiled, without appendage, ventral apical process elongate, almost straight, bent at tip, connected to sclerotized strap of vesical body, ventral process arising close to gonopore very long, broad, and laterally flattened, apex with irregular protuberances. Body shape most similar to *E. tantulus*, but distinguished by the different coloration (fig. 1), larger size, and characters of the male vesica, that is, the much shorter process arising close to the secondary gonopore in *E. aurum* (fig. 12).

**DESCRIPTION:** *Male:* Macropterous, small, ovoid; total length 2.40–2.85, length apex

clypeus–cuneal fracture 1.69–1.94, width across pronotum 1.10–1.20. **COLORATION** (fig. 1): General color yellow and white, often with light brown suffusion. **Head:** Yellow, vertex with whitish mark median to inner margin of eye, maxillary, mandibular plates, and gena light yellow, buccula, and gula almost white, and slightly tinged green. Labium pale yellow, last segment strongly infuscate. **Thorax:** Pronotum yellow with calli and posterior margin sometimes paler, whitish with green tinge, mesonotum and scutellum yellow with median area whitish. Pleura yellow, margins of propleuron, mesepisternum, and mesepimeron somewhat paler, evaporatorium very pale, almost white. **Legs:** Yellow, tibiae distally and tarsi slightly suffused, with few small light brown spots in distal third of all femora, tibial spines dark with dark bases. **Hemelytra:** Corium including clavus yellow, exocorium, distal parts of endocorium, and clavus distinctly suffused with brown, resulting in faint, crescent-shaped mark, cuneus white, membrane brown, usually with two white patches on anterior margin of hemelytron adjacent to cuneus, white mark distal to apex of posterior cell, and a white mark distal to clavus, veins white. **Abdomen** including pygophore: Yellow, sometimes with the basal segments more intensely yellow or orange and segments 8 and 9 whitish with green tinge. **STRUCTURE:** **Head:** Of moderate size, very broadly triangular in dorsal aspect, vertex about twice as wide as eye, anteocular area short, almost vertical, clypeus slightly produced, maxillary plate sunken, eye small, only a little more than half of height of head, not emarginate since antennal fossa removed from eye. Antenna with antennal fossa removed from anterior ventral margin of eye by about diameter of antennal segment 1. Antennal segment 1 slender and short, barely reaching apex of head. Labium slender, apex of labium barely surpassing base of mesocoxa. **Thorax:** Pronotum much wider than long. **Legs:** Moderately stout and short. Claws long and slender, pulvilli covering no more than proximal half of ventral surface of claw. **Hemelytra:** Slightly convex, cuneus triangular. **Abdomen:** Very stout, reaching to about apex of cuneus. **GENITALIA:** **Pygophore:** Very large and

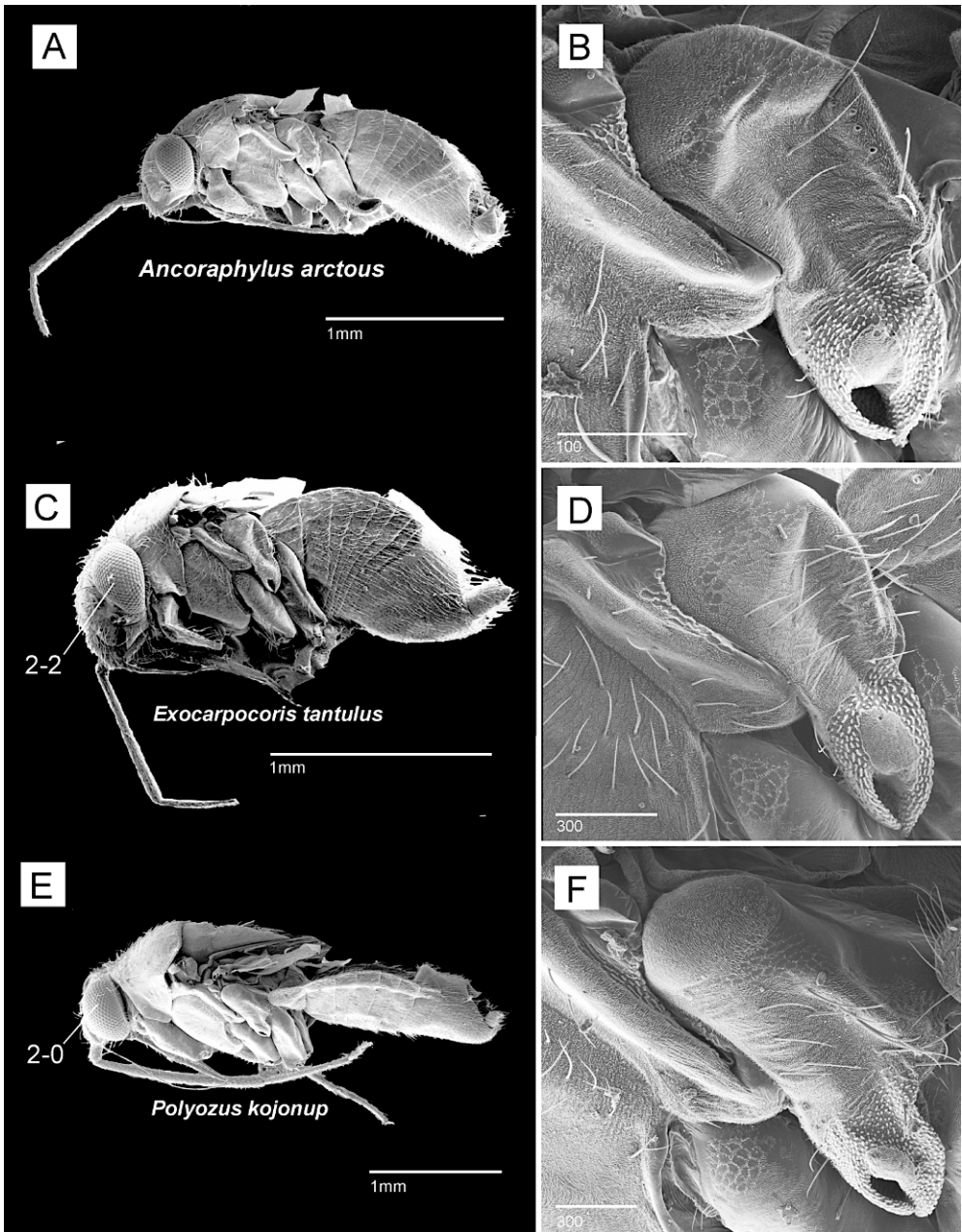


Fig. 3. Habitus in lateral view and evaporatorium of **A, B**, *Ancoraphylus arctous* (AMNH\_PBI 00087680); **C, D**, *Exocarpocoris tantulus* (AMNH\_PBI 00135796); **E, F**, *Polyozus kojonup* (AMNH\_PBI 00136470).

broad, taking up almost half of abdomen. Parameres: Right paramere broad (fig. 7); left paramere large, with posterior process straight and with tapering apex, body with

large horizontal lobe (fig. 8). Phallotheca (fig. 10): Large, smooth. Vesica (fig. 12): Large, body slender, with long dorsal and ventral apical processes; dorsal apical

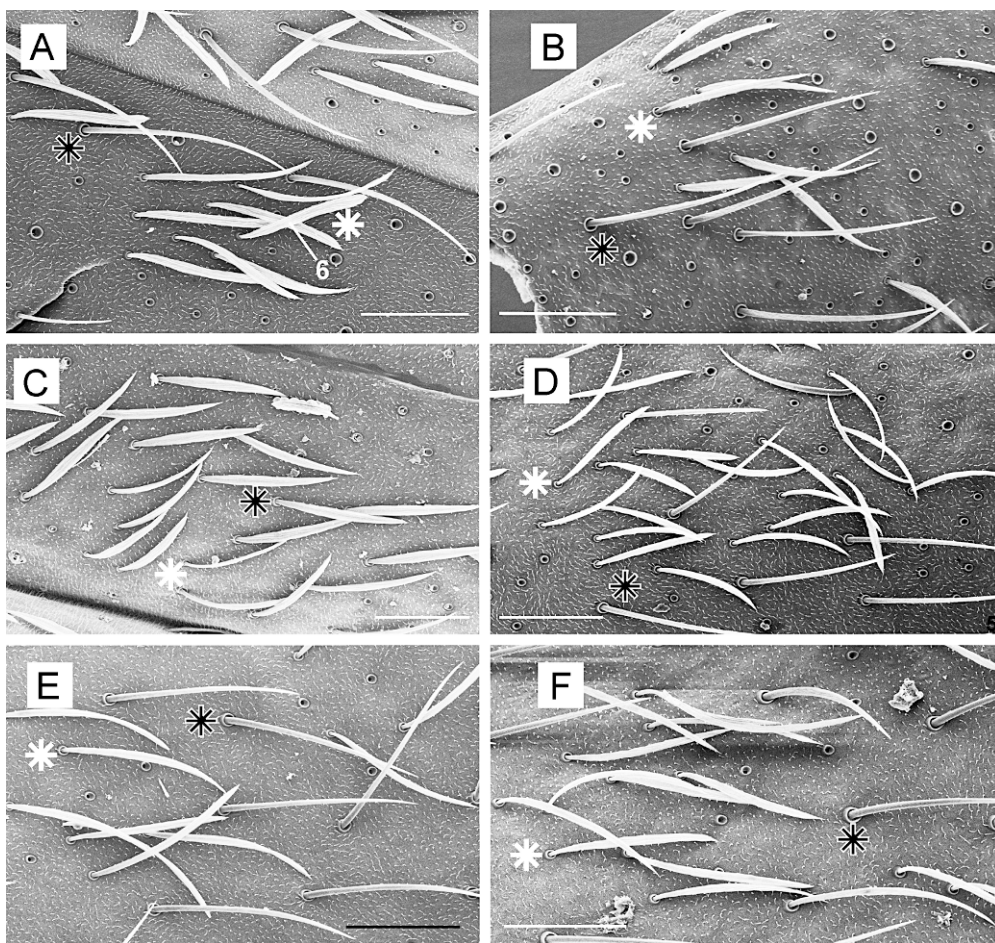


Fig. 4. Setae comprising hemelytral vestiture. **A**, *Ancorophylus arctous* (AMNH\_PBI 00087680); **B**, *Exocarpocoris tantulus* (AMNH\_PBI 00135796); **C**, *Polyozus bulita* (AMNH\_PBI 00168436); **D**, *P. furcilla* (AMNH\_PBI 00099437); **E**, *P. galbanus* (AMNH\_PBI 00139062); **F**, *P. kojonup* (AMNH\_PBI 00136470). Scale bar: 50  $\mu$ m.

process slender and tapering; process arising from proximal margin of secondary gonopore long.

**Female:** Coloration similar to male, slightly longer and stouter. Total length 2.83–2.98, length apex clypeus–cuneal fracture 1.95–2.07, width across pronotum 1.16–1.23.

**ETYMOLOGY:** Named for the golden yellow coloration, after Latin “aurum, -i” (n.) meaning gold or anything made of gold.

**Host** (appendix 1): The vast majority of specimens were recorded from *Exocarpos aphyllus* R. Br. (Santalaceae).

**DISTRIBUTION:** The range of distribution extends from South Australia to the south of Western Australia (fig. 16).

**DISCUSSION:** *Exocarpocoris aurum* is closely related to *E. tantulus* but is distinguished by the more yellowish coloration, larger size, and characters of the male genitalia. The two species are known to occur on the same host plant and are sympatric over most of their distribution.

**PARATYPES: AUSTRALIA: South Australia:** 20 km W of Nepabunna, Mt. Serle, 30. 55365°S 138.8304°E, 630 m, 07 Nov 1998,

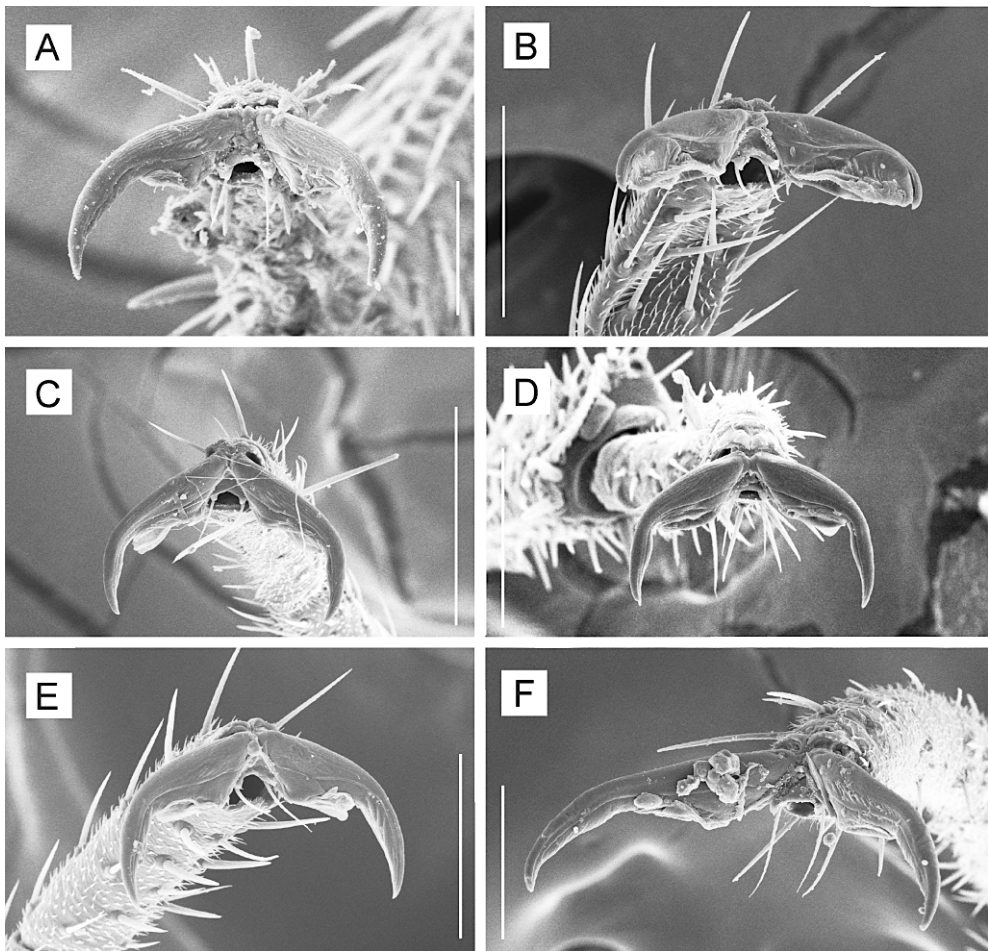


Fig. 5. Pretarsus. **A**, *Ancoraphylus arctous* (AMNH\_PBI 00087680); **B**, *Exocarpocoris tantulus* (AMNH\_PBI 00135796); **C**, *Polyozus bulita* (AMNH\_PBI 00168436); **D**, *P. furcilla* (AMNH\_PBI 00099437); **E**, *P. galbanus* (AMNH\_PBI 00139062); **F**, *P. kojonup* (AMNH\_PBI 00136470). Scale bar: 50  $\mu$ m.

Schuh, Cassis, Silveira, *Exocarpos aphyllus* R. Br. (Santalaceae), det. Royal Bot Gard. NSW 427339, 8 ♂ (AMNH\_PBI 00088250–0008257), 10 ♀ (AMNH\_PBI 00088258–00088267) (AM). *Exocarpos aphyllus* R. Br. (Santalaceae), det. Royal Bot Gard. NSW 427339, 4 ♂ (AMNH\_PBI 00130315–00130318), 4 ♀ (AMNH\_PBI 00130321–00130323, AMNH\_PBI 00130325) (AMNH). 41.5 km NW of Morgan, 33.63335°S 139.9167°E, 150 m, 01 Nov 1995, Schuh, Cassis, and Gross, *Exocarpos aphyllus* R. Br. (Santalaceae), det. B.M. Wiecek 1996 NSW 395968, 4 ♂ (AMNH\_PBI 00088277, AMNH\_PBI 00088278, AMNH\_PBI 00088282, AMNH\_PBI 00088283), 1 ♀ (AMNH\_PBI

00088297) (AM). *Exocarpos aphyllus* R. Br. (Santalaceae), det. B.M. Wiecek 1996 NSW 395968, 12 ♂ (AMNH\_PBI 00132473–00132481, AMNH\_PBI 00132483–00132485), 20 ♀ (AMNH\_PBI 00132487–00132497, AMNH\_PBI 00132499–00132501, AMNH\_PBI 00132504–00132506, AMNH\_PBI 00132508–00132510) (AMNH). 5 km SW of Whyalla, 33.05085°S 137.5004°E, 30 m, 21 Oct 1996, Schuh and Cassis, *Exocarpos aphyllus* R. Br. (Santalaceae), det. PERTH staff 05056209, 14 ♂ (AMNH\_PBI 00088268, AMNH\_PBI 00088269, AMNH\_PBI 00088298–00088309), 12 ♀ (AMNH\_PBI 00088270–00088275, AMNH\_PBI 00088314–00088319), 2 immatures (AMNH\_PBI 00088312, AMNH\_PBI

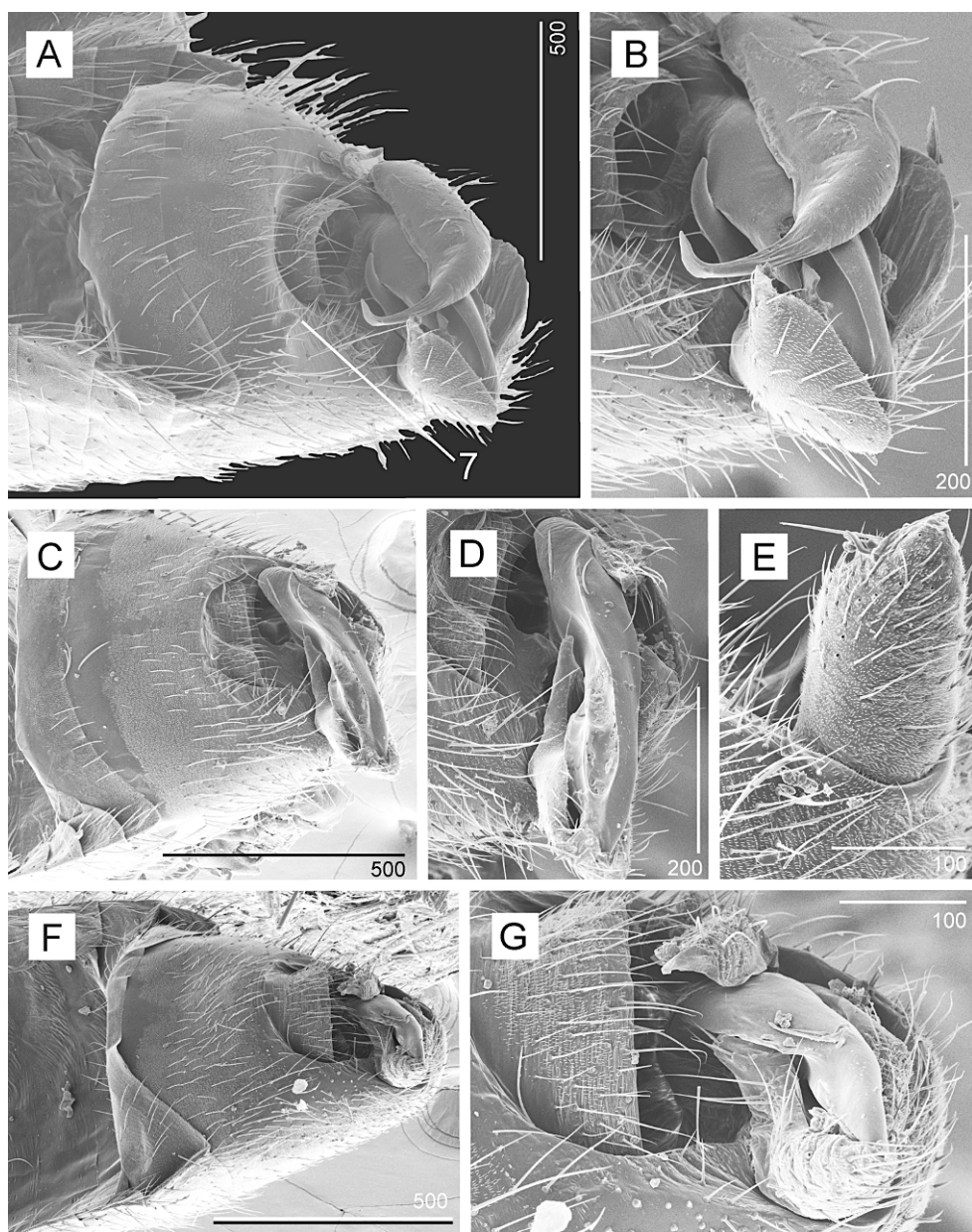


Fig. 6. Male genitalic structures of **A, B**, *Ancoraphylus arctous*; **C–E**, *Exocarpocoris tantulus*, and **F, G**, *Polyozus kojonup*. Scanning micrographs, scale bar measurements in  $\mu\text{m}$ . **A, C, F**, pygophore in dorsolateral view, **B, D, G**, detail of parameres and phallosome, **E**, ventral surface of left paramere.

00088313) (AM). *Exocarpos aphyllus* R. Br. (Santalaceae), det. PERTH staff 05056209, 9♂ (AMNH\_PBI 00137579, AMNH\_PBI 00137580, AMNH\_PBI 00137582–00137588), 9♀ (AMNH\_PBI 00137589–00137597) (AMNH). *Exocarpos aphyllus* R. Br. (San-

talaceae), det. PERTH staff 05056209, 2♂ (AMNH\_PBI 00088310, AMNH\_PBI 00088311), 2♀ (AMNH\_PBI 00088320, AMNH\_PBI 00088321) (WAMP). 75 km NW of Morgan, 5 km N Cane Grass, 33.53334°S 140.05°E, 100 m, 02 Nov 1995, Schuh, Cassis,

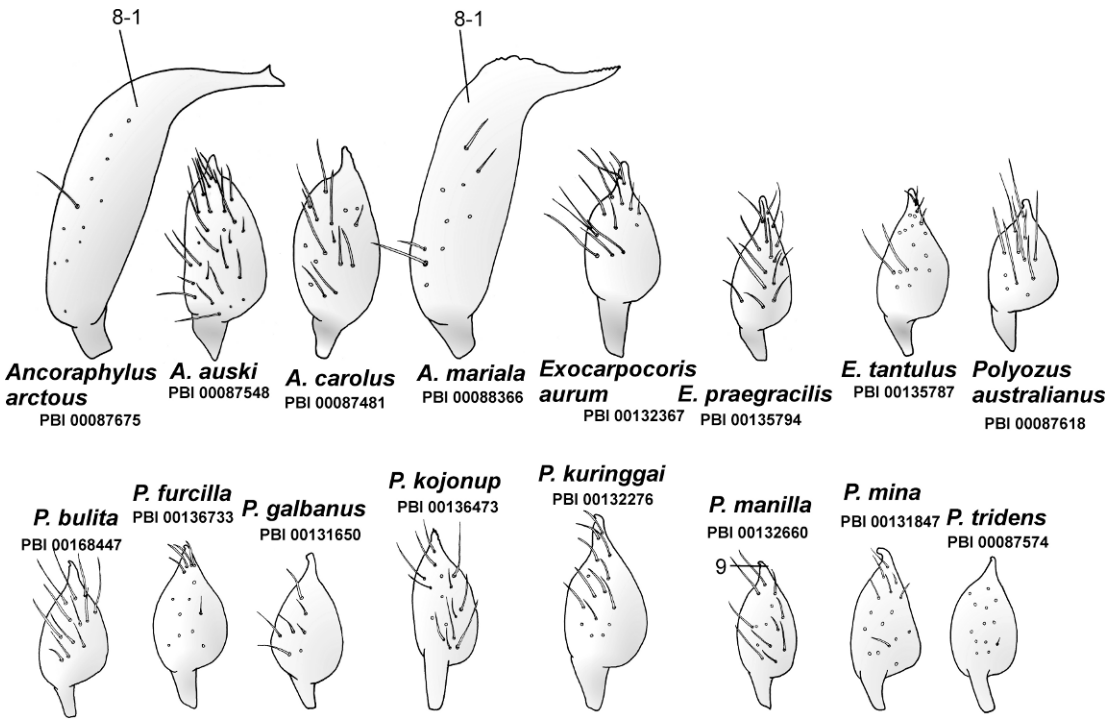


Fig. 7. Right parameres of species of *Ancoraphylus*, *Exocarpocoris*, and *Polyozus*.

and Gross, *Exocarpos aphyllus* R. Br. (Santalaceae), det. B.M. Wiecek NSW 395968, 8♂ (AMNH\_PBI 00088196, AMNH\_PBI 00088276, AMNH\_PBI 00088279–00088281, AMNH\_PBI 00088284–00088286), 10♀ (AMNH\_PBI 00088287–00088296) (AM). 8.8 km S of Oakbank, 33.11264°S 140.5524°E, 100 m, 08 Nov 1996, Schuh and Cassis, *Exocarpos aphyllus* (Santalaceae), 1♂ (AMNH\_PBI 00137574) (AMNH). 96 km NW of Morgan, Pine Valley Stn, 33.31667°S 140.2°E, 150 m, 02 Nov 1995, Schuh, Cassis, and Gross, *Exocarpos aphyllus* R. Br. (Santalaceae), det. B.M. Wiecek 1995 NSW 395968, 58♂ (AMNH\_PBI 00132368–00132370, AMNH\_PBI 00132321, AMNH\_PBI 00132324, AMNH\_PBI 00132328–00132333, AMNH\_PBI 00132335, AMNH\_PBI 00132337–00132341, AMNH\_PBI 00132343–00132347, AMNH\_PBI 00132349, AMNH\_PBI 00132350, AMNH\_PBI 00132357–00132367, AMNH\_PBI 00132371–00132393), 72♀ (AMNH\_PBI 00132394–00132398, AMNH\_PBI 00132400–00132423, AMNH\_PBI 00132426–00132443, AMNH\_PBI 00132446–001-

32467, AMNH\_PBI 00132469, AMNH\_PBI 00132470, AMNH\_PBI 00132472) (AMNH). Mt Serle district (near Gammon Ranges National Park), 30.55001°S 138.837°E, 567 m, 08 Nov 2001, Cassis, Schuh, Schwartz, *Exocarpos aphyllus* R. Br. (Santalaceae), det. NSW staff NSW666360, 1♂ (AMNH\_PBI 00097182), 1♀ (AMNH\_PBI 00097183) (AMNH). **Victoria:** Murray Sunset National Park, Lost Hope Track, 34.79166°S 141.8357°E, 55 m, 03 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Exocarpos aphyllus* R. Br. (Santalaceae), det. Field ID, 23♂ (AMNH\_PBI 00194442–00194464), 29♀ (AMNH\_PBI 00194465–00194493) (AMNH). **Western Australia:** 55.6 km SE of Southern Cross, 31.58895°S 119.5926°E, 470 m, 04 Dec 1997, Schuh, Cassis, Brailovsky, Asquith, *Melaleuca uncinata* R. Br. (Myrtaceae), det. PERTH staff 05055989, 9♂ (AMNH\_PBI 00088202–00088210), 3♀ (AMNH\_PBI 00088214–00088216), 1 immature (AMNH\_PBI 00088211) (AM). *Melaleuca uncinata* R. Br. (Myrtaceae), det. PERTH staff 05055989, 2♂ (AMNH\_PBI 00088200, AMNH\_PBI

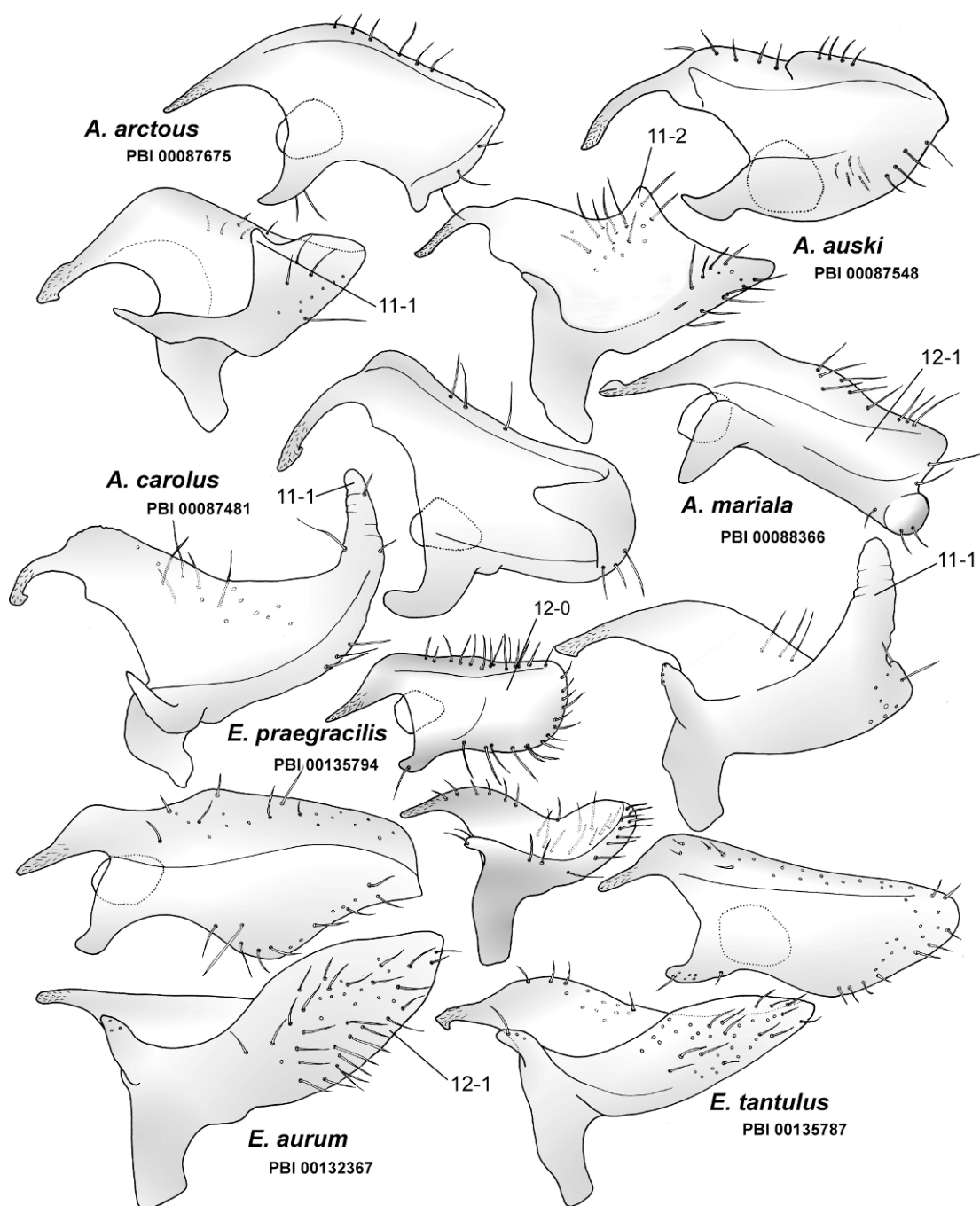


Fig. 8. Left paramere of species of *Ancoraphylus* and *Exocarpocoris*, shown in dorsal and lateral view. Numbers on illustrations refer to characters and character states in table 2.

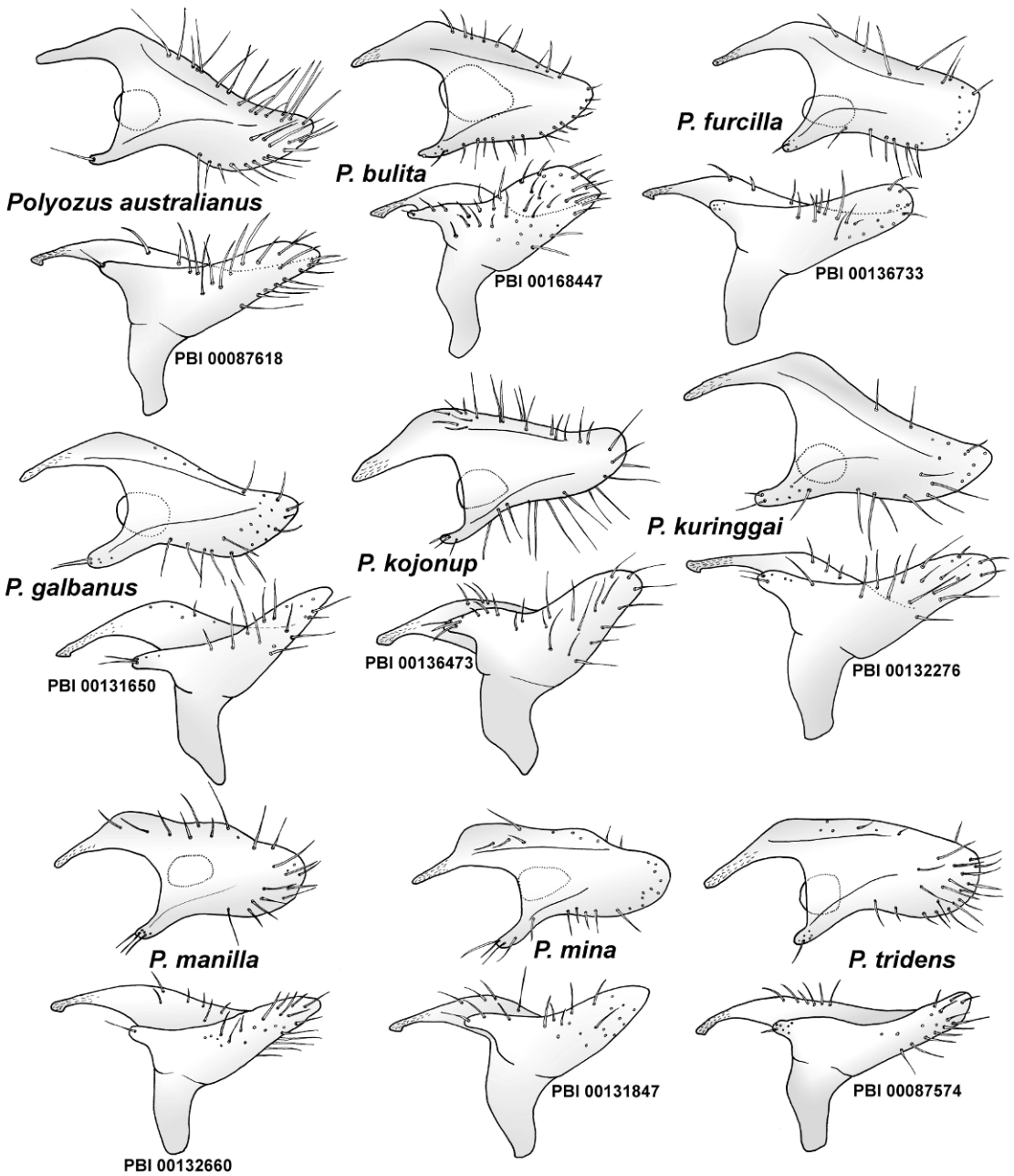


Fig. 9. Left paramere of species of *Polyozus*, shown in dorsal and lateral view. Numbers on illustrations refer to characters and character states in table 2.

00088201), 2♀ (AMNH\_PBI 00088212, AMNH\_PBI 00088213) (WAMP). Eneabba on Brand Highway, 29.80735°S 115.2699°E, 100 m, 31 Oct 1996, Schuh and Cassis, *Exocarpos* sp. (Santalaceae), 4♂ (AMNH\_

PBI 00089793, AMNH\_PBI 00089795–000-89797), 11♀ (AMNH\_PBI 00089798–000-89803, AMNH\_PBI 00089805, AMNH\_PBI 00089807–00089810) (AM). Moorine Rocks, 11.7 km N of Great Eastern Highway on

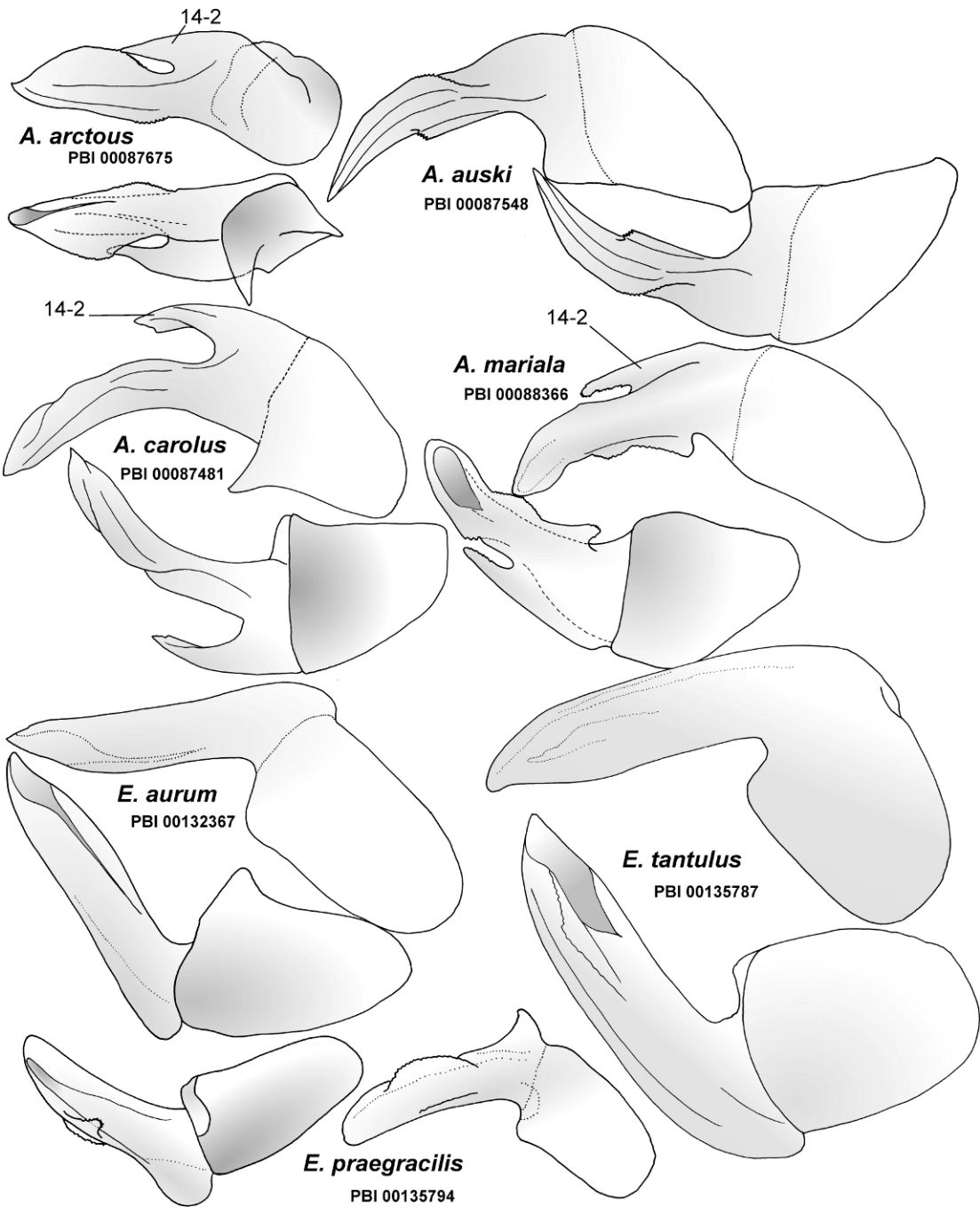


Fig. 10. Phallotheca of species of *Ancoraphylus* and *Exocarpocoris*, in dorsal and ventral perspective. Numbers on illustrations refer to characters and character states in table 2.

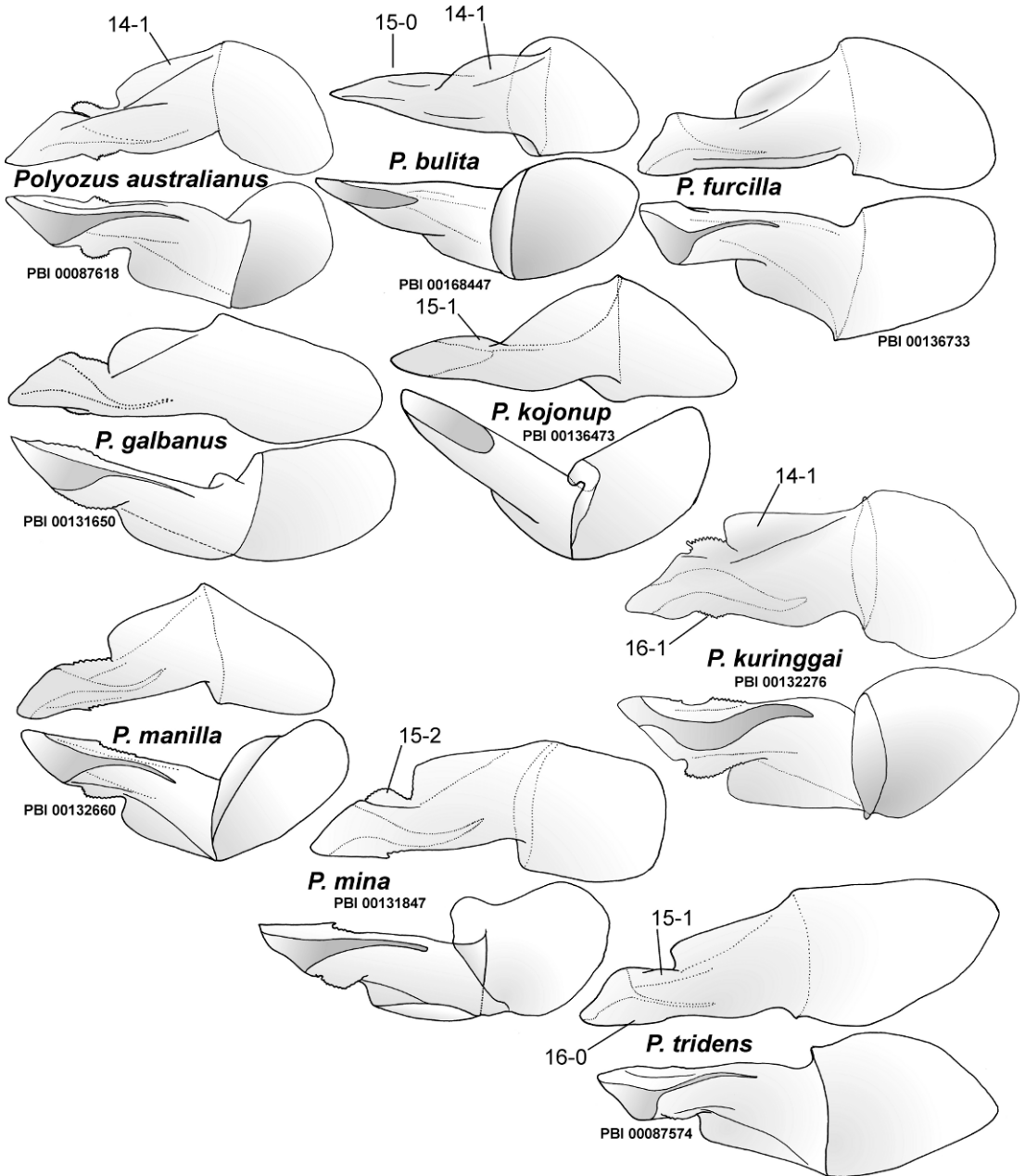


Fig. 11. Phallosome of species of *Polyozus*, in dorsal and ventral perspective. Numbers on illustrations refer to characters and character states in table 2.

Noongar Road, 31.22843°S 118.979°E, 345 m, 04 Dec 1997, Schuh, Cassis, Brailovsky, Asquith, *Exocarpos aphyllus* R. Br. (Santalaceae), det. PERTH staff 05056020, 1♀ (AMNH\_PBI 00089972) (AM). ca 35 km S of

Menzies, 29.96214°S 121.1323°E, 600 m, 24 Oct 1996, Schuh and Cassis, *Exocarpos aphyllus* R. Br. (Santalaceae), det. PERTH staff 05056136 Host 96-44, 1♀ (AMNH\_PBI 00135803) (AMNH).

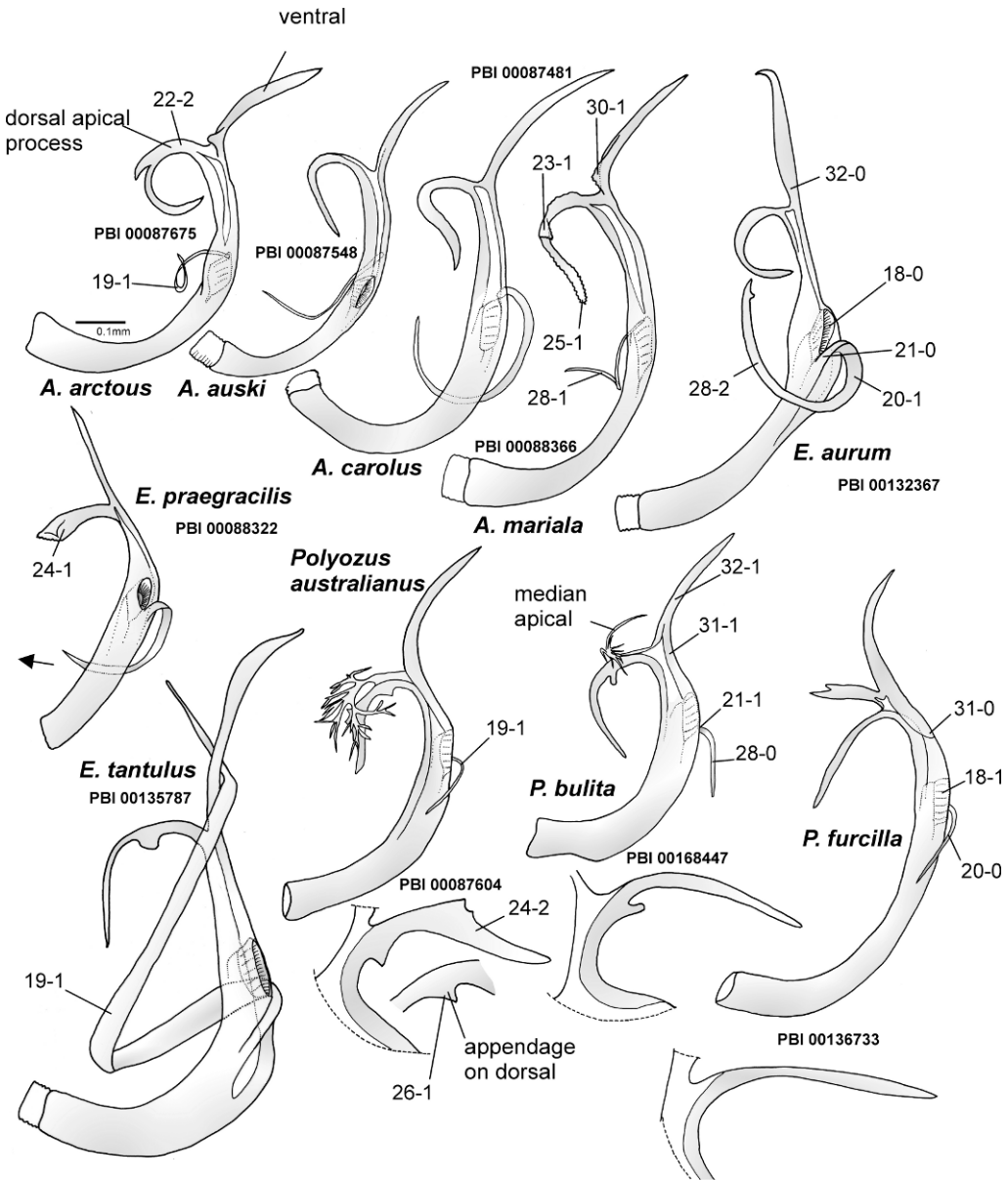


Fig. 12. Vesica of species of *Ancoraphylus*, *Exocarpocoris*, and *Polyozus*.

*Exocarpocoris praegracilis*, new species  
figures 1, 7, 8, 10, 12, 14, 16, 18–20

**HOLOTYPE:** AUSTRALIA: Western Australia: 55.6 km SE of Southern Cross, 31.58895°S 119.5926°E, 470 m, 04 Dec 1997, Schuh, Cassis, Brailovsky, Asquith, *Melaleuca uncinata* R. Br. (Myrtaceae), det.

PERTH staff 05055989, 1 ♂ (AMNH\_PBI 00087139) (WAMP).

**DIAGNOSIS:** Recognized by the moderate size, slender ovoid body, and narrow vertex, distinct color pattern consisting of cream, yellow, and brown, with distal area of corium dark brown, and characters of the male genitalia, such as the moderate-sized vesica,

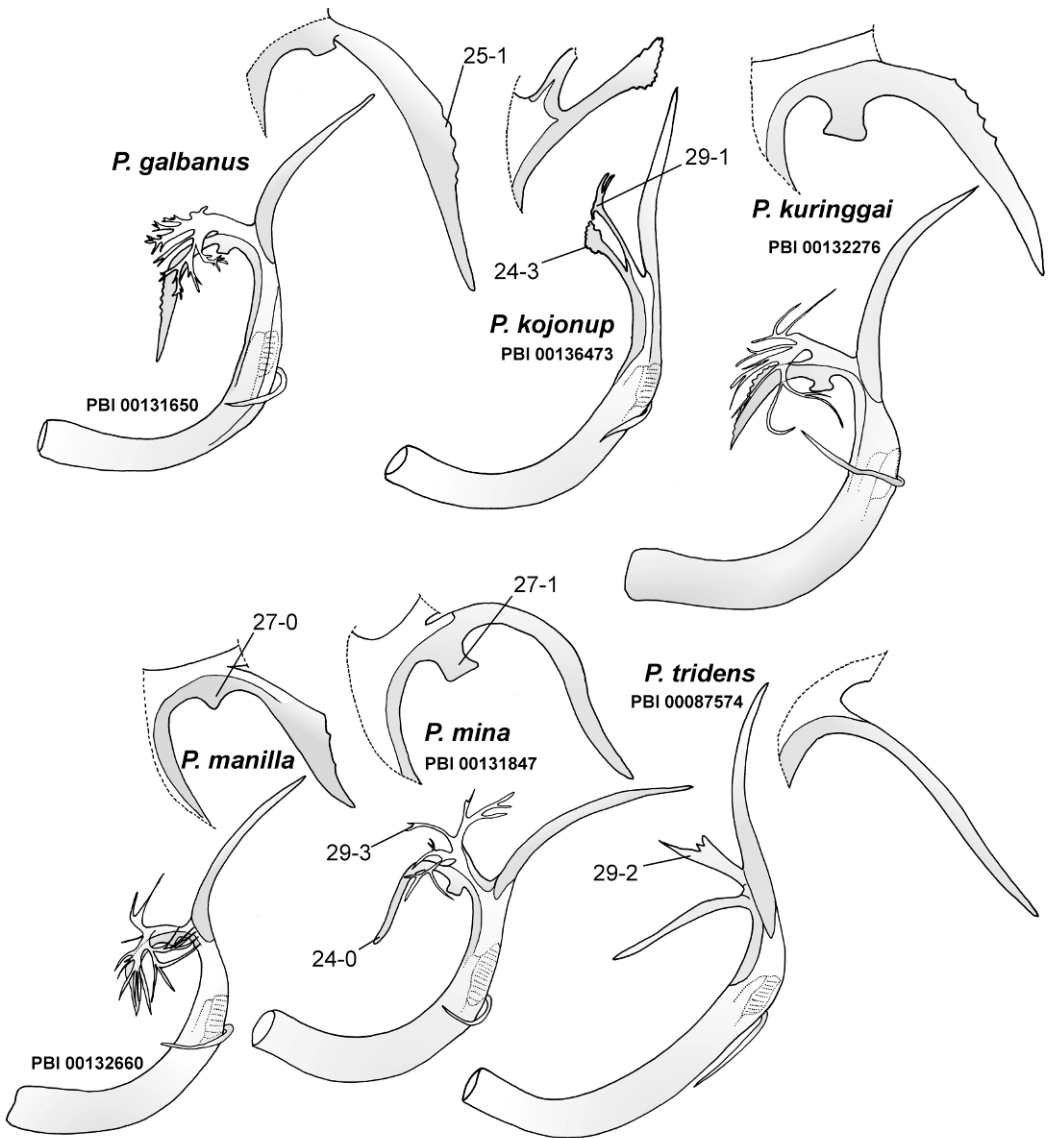


Fig. 13. Vesica of species of *Polyozus*.

dorsal and ventral apical processes of moderate length, dorsal apical process truncate, with small triangular process, process arising from proximal margin of secondary gonopore of moderate length. Color pattern most similar to *E. tantulus* but distinguished by the different body shape and characters of the male genitalia.

**DESCRIPTION:** *Male:* Macropterous, small, elongate ovate, total length 2.85–2.94, apex

clypeus–cuneal fracture 1.87–1.98, width across pronotum 1.01–1.07. **COLORATION** (fig. 1): General coloration yellow, white, and brown. **Head:** Yellow, with maxillary and mandibular plates, gena, and buccula very pale yellow. Labium pale yellow, last segment strongly infusate. **Thorax:** Pronotum, mesonotum, and scutellum pale yellow, with anterior margin of pronotum whitish. Pleura uniformly pale yellow. **Legs:** Pale yellow,

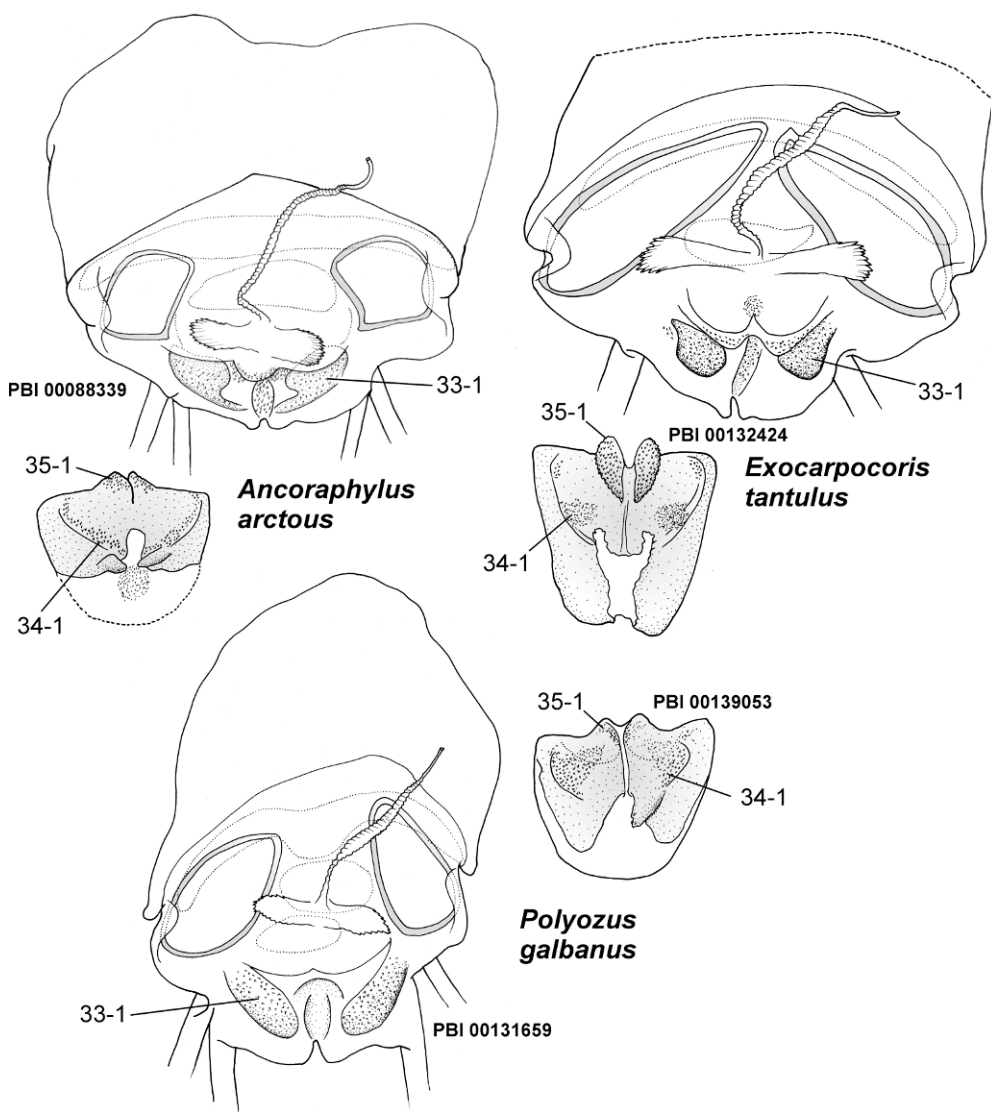


Fig. 14. Female genitalic structures in *Ancoraphylus*, *Exocarpocoris*, and *Polyozus*, comprising bursa copulatrix in dorsal view and posterior wall in ventral view.

tibiae distally and tarsi slightly suffused, with tibial spines dark, bases pale. **Hemelytra:** Corium pale yellow with distal part of endocorium and clavus brown, resulting in crescent-shaped brown mark, cuneus whitish, membrane light brown with two whitish or transparent patches on anterior margin of hemelytron distal to cuneus, whitish mark distal to clavus, veins white. **Abdomen:** Including pygophore pale yellow with green tinge. **STRUCTURE:** Head: Small, with head

broadly triangular in dorsal aspect, vertex about 1.5 times as wide as eye, anteocular area of moderate length, clypeus strongly produced, maxillary plate sunken; eye of moderate size, extending over three-fourths height of head, slightly emarginate at antennal fossa; antennal fossa adjacent to anteroventral margin of eye. Antennal segment 1 slender and short, barely surpassing apex of head. Labium slender, apex of labium not reaching base of mesocoxa. Thorax: Pronotum wider than

long. *Legs*: Slender and moderately long. Claws long and slender, pulvilli covering no more than proximal half of ventral surface of claw. *Hemelytra*: Almost parallel-sided, cuneus triangular. *Abdomen*: Slender, reaching to about apex of cuneus. **GENITALIA**: *Pygophore*: Of moderate size, occupying about one-third of abdomen, gradually tapering. *Parameres*: Right paramere, broadly lanceolate (fig. 7); left paramere of moderate size, posterior process slightly bent ventrad in lateral view, body only moderately extended horizontally (fig. 8). *Phallosome* (fig. 10): Of moderate size, with finely serrate lobe on posterior surface. *Vesica* (fig. 12): Of moderate size, dorsal and ventral apical processes of moderate length; dorsal apical process truncate, with small triangular process; process arising from proximal margin of secondary gonopore of moderate length.

*Female*: Unknown.

**ETYMOLOGY**: Named for the comparatively slender body among species of *Exocarpocoris*, after Latin adjective “*praegracilis*, -e” meaning very slender.

**HOST** (appendix 1): Four of the five specimens were collected on *Exocarpocoris aphyllus*, and one specimen on *Melaleuca unciniata*. This last specimen was chosen as the holotype because of its condition compared to other specimens examined. The host record for this specimen is here considered a sitting record rather than a breeding host.

**DISTRIBUTION**: Known from three localities in the south of Western Australia (fig. 16).

**DISCUSSION**: *Exocarpocoris praegracilis* lacks the characteristic ovoid body shape, wide vertex, and wide pronotum, as well as the small eyes of the two other species of *Exocarpocoris* and is treated as the sister species of *E. aurum* + *E. tantulus* in the cladistic analyses (figs. 18, 19). The general structure of the male genitalia together with the color pattern on the hemelytron and the shared host plant justify the placement of this species in the genus *Exocarpocoris*.

**PARATYPES**: **AUSTRALIA: Western Australia**: Moorine Rocks, 11.7 km N of Great Eastern Highway on Noongar Road, 31.22843°S 118.979°E, 345 m, 04 Dec 1997, Schuh, Cassis, Brailovsky, Asquith, *Exocarpus*

*aphyllus* R. Br. (Santalaceae), det. PERTH staff 05056020, 1♂ (AMNH\_PBI 00089957) (WAMP). ca 35 km S of Menzies, 29.96214°S 121.1323°E, 600 m, 24 Oct 1996, Schuh and Cassis, *Exocarpus aphyllus* R. Br. (Santalaceae), det. PERTH staff 05056136, 1♂ (AMNH\_PBI 00088322) (AM). *Exocarpus aphyllus* R. Br. (Santalaceae), det. PERTH staff 05056136, 1♂ (AMNH\_PBI 00135788) (AMNH). *Exocarpus aphyllus* R. Br. (Santalaceae), det. PERTH staff 05056136, 1♂ (AMNH\_PBI 00135794) (WAMP).

*Exocarpocoris tantulus*, new species  
figures 1, 3–8, 10, 12, 14, 16, 18–20

**HOLOTYPE**: **AUSTRALIA: South Australia**: 96 km NW of Morgan, Pine Valley Stn, 33.31667°S 140.2°E, 150 m, 02 Nov 1995, Schuh, Cassis, and Gross, *Exocarpus aphyllus* (Santalaceae), det. B.M. Wiecek NSW 395968, 1♂ (AMNH\_PBI 00132322) (AM).

**DIAGNOSIS**: Recognized by the small size, ovoid body, and broad head, distinct color pattern consisting of cream, yellow, and brown, with distal area of corium dark brown. Further characterized by the large vesica with the dorsal and ventral apical processes long and slender, the dorsal apical process with a squarish process, and the process arising from proximal margin of secondary gonopore very long, sometimes coiling around ventral apical process. Body shape most similar to *E. aurum* but distinguished by the different size and coloration.

**DESCRIPTION**: *Male*: Macropterous, small, ovoid, total length 2.07–2.37, length apex clypeus–cuneal fracture 1.49–1.59, width across pronotum 0.92–1.04. **COLORATION** (fig. 1): General coloration yellow, white, and brown. **Head**: Whitish with green tinge with several orange lines, one at midline, and several transverse lines on vertex, base of mandibular and maxillary plates, fasciae orange, gena and gula suffused with greenish coloration. Labium pale yellow, last segment infuscate. **Thorax**: Pronotum whitish with green tinge and two irregular paired orange patches on posterior lobe, mesonotum orange with whitish midline, scutellum whitish with green tinge, base with paired orange patches. Propleuron whitish with green dorsal margin

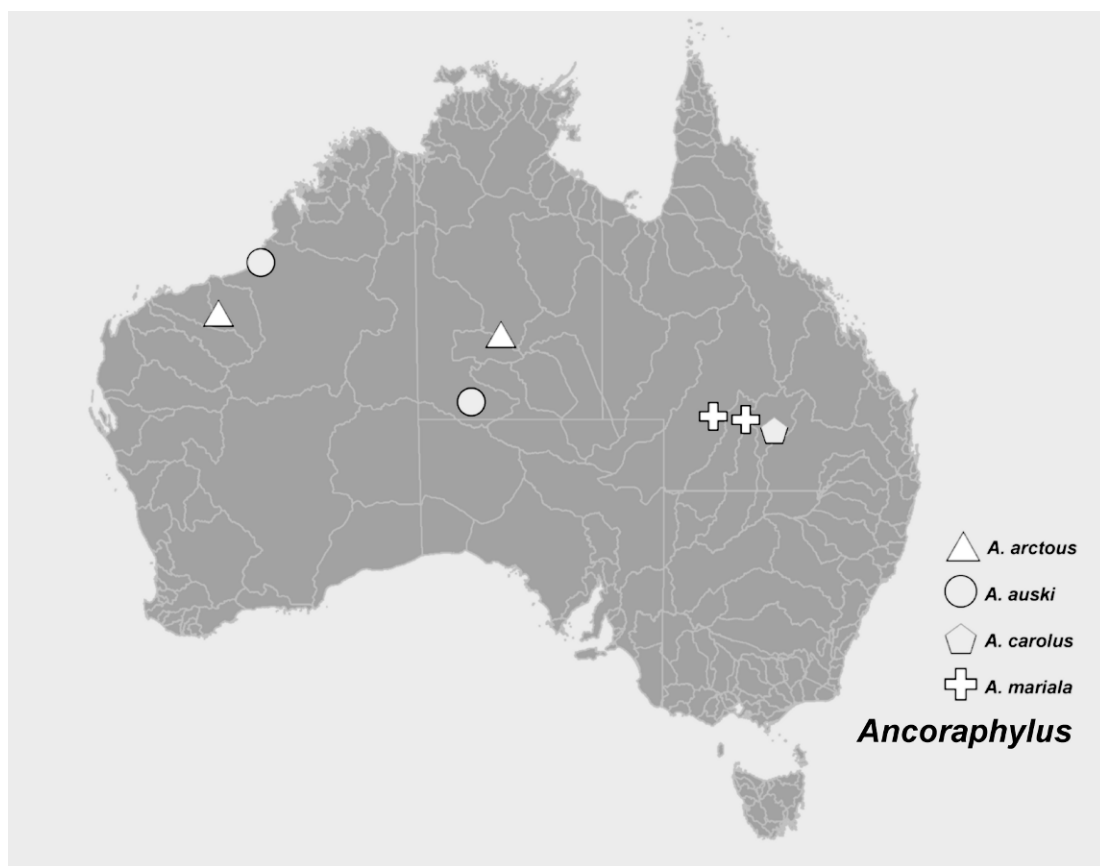


Fig. 15. Distribution of species of *Ancoraphylus*.

and central orange spot, mesopleuron whitish and orange, metapleuron whitish with central orange spot, evaporatorium whitish. *Legs*: Pale yellow, tibiae distally and tarsi slightly suffused, with few small light brown spots in distal third of pro- and mesofemora and distal half of metafemur, tibial spines dark with dark bases. *Hemelytra*: Corium whitish and yellow with distal half of clavus, distal two-thirds of endocorium (with the exception of white distal mark), and distal fourth of exocorium dark brown, resulting in crescent-shaped dark mark, cuneus white, membrane brown with two white patches on anterior margin of hemelytron distal to apex of cuneus, one mark distal to apex of posterior cell, and a white mark distal to clavus, veins white. *Abdomen*: Whitish with transverse yellow and brown, sometimes also green marks, pygophore whitish with yellow marks. **STRUCTURE**: Head:

Of moderate size, very broadly triangular in dorsal aspect, vertex about twice as wide as eye, anteocular area short, almost vertical, clypeus produced, eye small (fig. 3C), only a little more than half of height of head, not emarginate since antennal fossa removed from eye. Antenna with antennal fossa removed from anterior ventral margin of eye by about diameter of antennal segment 1. Antennal segment 1 slender and short, not reaching apex of head. Labium slender, apex of labium reaching base of metacoxa. *Thorax*: Pronotum much wider than long; evaporatory area of metathoracic gland as in figure 3D. *Legs*: Moderately stout and short. Claws small and slender, pulvilli almost covering entire ventral surface of claw. *Hemelytra*: Slightly convex, cuneus triangular. *Abdomen*: Very stout, reaching to about apex of cuneus. **GENITALIA**: Pygophore (fig. 6C): Very

large and broad, taking up almost half of abdomen. **Parameres:** Right paramere broad (fig. 7); left paramere large, with posterior process slightly bent ventrad and with truncate apex, body with large horizontal lobe (figs. 6D, E, 8). **Phallotheca** (figs. 6D, 10): Large, with serrate lobe in anteroventral position, close to opening. **Vesica** (fig. 12): Large, body stout, dorsal and ventral apical processes long and slender; dorsal apical process slender and tapering, with squarish process; process arising from proximal margin of secondary gonopore very long, sometimes coiling around ventral apical process.

**Female:** Coloration similar to male, slightly longer than male. Total length 2.41–2.54, length apex clypeus–cuneal fracture 1.62–1.74, width across pronotum 0.95–1.05.

**ETYMOLOGY:** Named for its comparatively small size compared to *E. aurum* and *E. praegracilis*, after Latin adjective “tantulus, -a, -um” meaning so small.

**Host** (appendix 1): Recorded from *Exocarpos aphyllus* R. Br. (Santalaceae).

**DISTRIBUTION:** Ranges from South Australia to the Shark Bay area of Western Australia. Its distribution extends farther north than the distribution of *E. aurum* (fig. 16).

**DISCUSSION:** *Exocarporis tantulus* is closely related to *E. aurum* (figs. 18, 19) but is distinguished from its sister species by the more distinct color pattern, smaller size, and structures of the male genitalia.

**PARATYPES:** **AUSTRALIA: South Australia:** 20 km W of Nepabunna, Mt. Serle, 30.55365°S 138.8304°E, 630 m, 07 Nov 1998, Schuh, Cassis, Silveira, *Exocarpos aphyllus* R. Br. (Santalaceae), det. Royal Bot Gard. NSW 427339, 2♂ (AMNH\_PBI 00088189, AMNH\_PBI 00088190), 4♀ (AMNH\_PBI 00088191–00088194) (AM). *Exocarpos aphyllus* R. Br. (Santalaceae), det. Royal Bot Gard. NSW 427339, 2♂ (AMNH\_PBI 00130314, AMNH\_PBI 00130319), 3♀ (AMNH\_PBI 00130320, AMNH\_PBI 00130324, AMNH\_PBI 00130326) (AMNH). 41.5 km NW of Morgan, 33.63335°S 139.9167°E, 150 m, 01 Nov 1995, Schuh, Cassis, and Gross, *Exocarpos aphyllus* R. Br. (Santalaceae), det. B.M. Wiecek 1996 NSW 395968, 2♂ (AMNH\_PBI 00132482, AMNH\_PBI 00132486), 4♀ (AMNH\_PBI 00132498, AMNH\_PBI 00132502, AMNH\_PBI

00132503, AMNH\_PBI 00132507) (AMNH). 75 km NW of Morgan, 5 km N Cane Grass, 33.53334°S 140.05°E, 100 m, 02 Nov 1995, Schuh, Cassis, and Gross, *Exocarpos aphyllus* R. Br. (Santalaceae), det. B.M. Wiecek NSW 395968, 1♂ (AMNH\_PBI 00088195), 3♀ (AMNH\_PBI 00088197–00088199) (AM). 8.8 km S of Oakbank, 33.11264°S 140.5524°E, 100 m, 08 Nov 1996, Schuh and Cassis, *Exocarpos* sp. (Santalaceae), 2♂ (AMNH\_PBI 00137573, AMNH\_PBI 00089794), 3♀ (AMNH\_PBI 00089804, AMNH\_PBI 00089806, AMNH\_PBI 00089811, AMNH\_PBI 00137575–00137577) (AM). 96 km NW of Morgan, Pine Valley Stn, 33.31667°S 140.2°E, 150 m, 02 Nov 1995, Schuh, Cassis, and Gross, *Exocarpos aphyllus* (Santalaceae), det. B.M. Wiecek NSW 395968, 11♂ (AMNH\_PBI 00132323, AMNH\_PBI 00132325–00132327, AMNH\_PBI 00132334, AMNH\_PBI 00132336, AMNH\_PBI 00132342, AMNH\_PBI 00132348, AMNH\_PBI 00132351–00132353), 2♀ (AMNH\_PBI 00132399, AMNH\_PBI 00132444) (AMNH). *Exocarpos aphyllus* (Santalaceae), det. B.M. Wiecek NSW 395968, 1♂ (AMNH\_PBI 00132356), 1♀ (AMNH\_PBI 00132471) (CNC). *Exocarpos aphyllus* (Santalaceae), det. B.M. Wiecek NSW 395968, 1♂ (AMNH\_PBI 00132355), 1♀ (AMNH\_PBI 00132468) (USNM). *Exocarpos aphyllus* (Santalaceae), det. B.M. Wiecek NSW 395968, 1♂ (AMNH\_PBI 00132354), 1♀ (AMNH\_PBI 00132445) (ZISP). **Victoria:** Murray Sunset National Park, Lost Hope Track, 34.79166°S 141.8357°E, 55 m, 03 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Exocarpos aphyllus* R. Br. (Santalaceae), det. Field ID, 1♀ (AMNH\_PBI 00194441) (AMNH). **Western Australia:** 11 km N of Coolgardie-Esperance Highway on Kambalda Road, 31.25231°S 121.5899°E, 320 m, 18 Nov 1999, R.T. Schuh and G. Cassis, *Exocarpos aphyllus* R. Br. (Santalaceae), det. PERTH staff 05670675, 4♂ (AMNH\_PBI 00088183–00088186), 2♀ (AMNH\_PBI 00088187, AMNH\_PBI 00088188) (AMNH). 24 km SE of jct of Manga Rd and Shark Bay Rd, Shark Bay World Heritage Area, 26.39014°S 114.0094°E, 60 m, 26 Oct 2004, Cassis, Wall, Weirauch, Symonds, *Exocarpos aphyllus* R. Br. (Santalaceae), det. Field ID, 1♂ (AMNH\_PBI

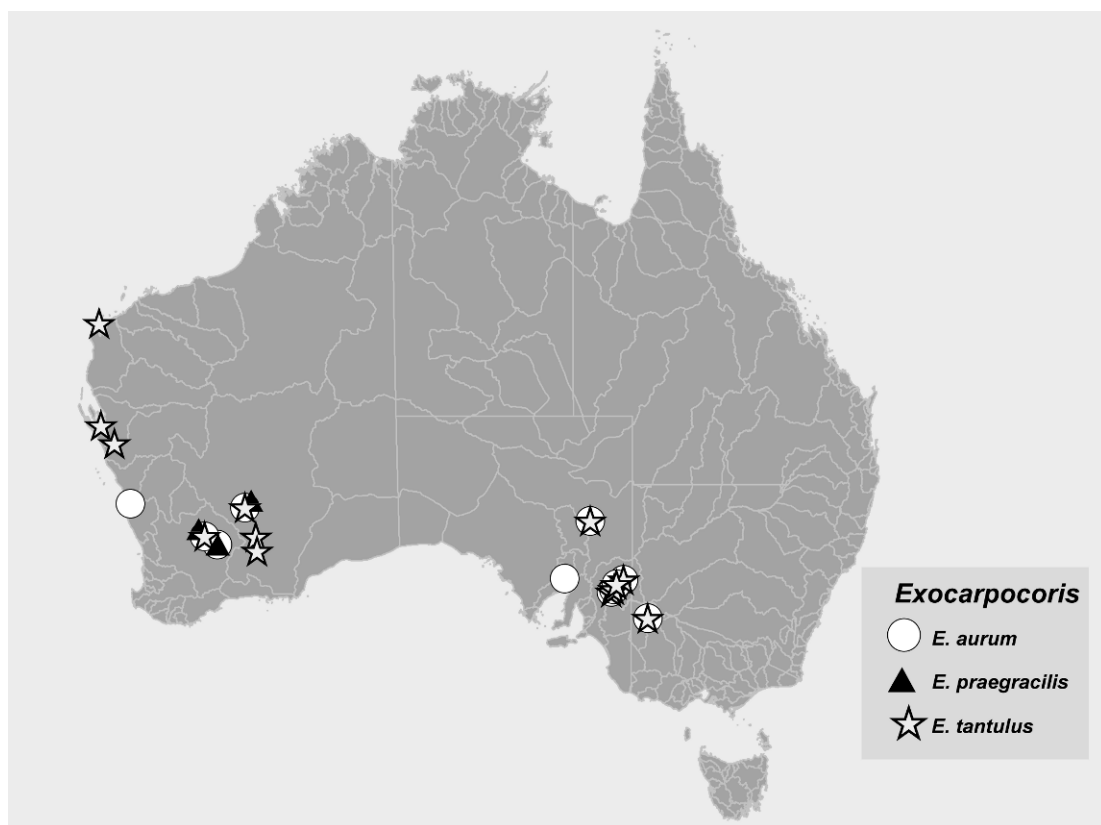


Fig. 16. Distribution of species of *Exocarpocoris*.

00088492), 7 ♀ (AMNH\_PBI 00088493–00088499) (AM). 43 km N of Norseman, 31.85648°S 121.6414°E, 300 m, 19 Nov 1999, R. T. Schuh, G. Cassis, & R. Silveira, *Exocarpus aphyllus* R. Br. (Santalaceae), det. PERTH staff 05670675, 1 ♂ (AMNH\_PBI 00087322), 1 ♀ (AMNH\_PBI 00087323) (AM). *Exocarpus aphyllus* R. Br. (Santalaceae), det. PERTH staff 05670675, 3 ♂ (AMNH\_PBI 00088217–00088219), 2 ♀ (AMNH\_PBI 00088220, AMNH\_PBI 00088221) (AMNH). 89.2 km N of jct of Agana Kilabarra Rd and Brand Highway, on Brand Highway, 27.18877°S 114.6159°E, 178 m, 24 Oct 2004, Cassis, Wall, Weirauch, Symonds, *Exocarpus aphyllus* R. Br. (Santalaceae), det. PERTH 6989837, 2 ♂ (AMNH\_PBI 00090605, AMNH\_PBI 00090606), 4 ♀ (AMNH\_PBI 00090607–00090610) (AM). Exmouth (waste area behind sand-dune), Truscott Crescent (opposite Pony Club), 21.94606°S 114.

1358°E, 10 m, 31 Oct 2004, Cassis, Wall, Weirauch, Tatarnic, Symonds, *Exocarpus* sp. (Santalaceae), 1 ♂ (AMNH\_PBI 00090598), 6 ♀ (AMNH\_PBI 00090599–00090604) (AM). Moorine Rocks, 11.7 km N of Great Eastern Highway on Noongar Road, 31.22843°S 118.979°E, 345 m, 04 Dec 1997, Schuh, Cassis, Brailovsky, Asquith, *Exocarpus aphyllus* R. Br. (Santalaceae), det. PERTH staff 05056020, 14 ♂ (AMNH\_PBI 00088222–00088229, AMNH\_PBI 00089956, AMNH\_PBI 00089958–00089962), 22 ♀ (AMNH\_PBI 00088234–00088248, AMNH\_PBI 00089967, AMNH\_PBI 00089969–00089971, AMNH\_PBI 00089973–00089975), 8 immatures (AMNH\_PBI 00088231–00088233, AMNH\_PBI 00089963–00089966, AMNH\_PBI 00089968) (AM). *Exocarpus aphyllus* R. Br. (Santalaceae), det. PERTH staff 05056020, 1 ♂ (AMNH\_PBI 00088230), 1 ♀ (AMNH\_PBI 00088249) (WAMP). ca 35 km S of

Menzies, 29.96214°S 121.1323°E, 600 m, 24 Oct 1996, Schuh and Cassis, *Exocarpos aphyllus* R. Br. (Santalaceae), det. PERTH staff 05056136, 16♂ (AMNH\_PBI 00135784–00135787, AMNH\_PBI 00135789–00135799, AMNH\_PBI 00135801), 5♀ (AMNH\_PBI 00135806–00135810), 1 immature (AMNH\_PBI 00135802) (AM). *Exocarpos aphyllus* R. Br. (Santalaceae), det. PERTH staff 05056136, 3♂ (AMNH\_PBI 00135782, AMNH\_PBI 00135783, AMNH\_PBI 00135800), 2♀ (AMNH\_PBI 00135804, AMNH\_PBI 00135805) (WAMP).

*Polyozus*, Eyles and Schuh, 2003  
figures 1–7, 9, 11–14, 17–20

*Polyozus* Eyles and Schuh, 2003: 302–304.

TYPE SPECIES: *Polyozus galbanus* Eyles and Schuh, 2003.

REVISED DIAGNOSIS: Recognized among Phylini by the small, elongate ovoid to large and elongate body, uniformly yellowish green, reddish brown, or brown, light green and orange coloration, mixture of suberect dark and subadpressed, flattened, silvery setae, large eyes, and characters of the male genitalia, most notably the J-shaped vesica, with dorsal and ventral apical processes forming anchor-shaped apex and additional median apical process in shape of tree or fork, secondary gonopore distal to middle of vesica, facing caudad, slender, short, straight process arising from proximal margin of secondary gonopore, usually bent left. Among Australian Phylini, similar to *Ancoraphylus*, n.gen. and *Exocarpocoris*, n.gen. in type of vestiture and in characters of the male (e.g., shape of vesica, presence of process arising close to secondary gonopore) and female genitalia (ornamentation of posterior wall and dorsal labiate plate), but distinguished by size, shape, and coloration as well as characters of the male genitalia given above.

REVISED DESCRIPTION: *Male*: Macropterous, small to large, elongate and slender, moderately elongate ovate, or ovoid and stout, total length 2.40–4.44, length apex clypeus–cuneal fracture 1.58–2.83, width across pronotum 0.84–1.27. COLORATION (figs. 1, 2): Overall coloration either rather uniformly pale green, brownish green, or pale yellowish

green, sometimes with orange tinge, light brown with red tinge, or brown, with green pronotum, orange mesonotum, and orange or green scutellum. Head: Either uniformly greenish yellow or brownish green or vertex dark with clypeus, mandibular and maxillary plates, gena, and gula pale reddish brown, or head pale with red marks. Antenna usually pale, infusate toward apex, segment 1 with or without subbasal dark ring. Labium generally pale, infusate toward apex. Thorax: Pronotum, mesonotum, and scutellum either rather uniformly pale green or pale orange, or light brown with red suffusion, or pronotum pale green, with mesonotum orange, and scutellum pale green or orange. Pleura usually rather uniformly pale green or orange, sometimes pale with red suffusion, or pale green and dark brown or orange. Legs: Usually uniformly pale with tarsi infusate, small dark spots on femora, and tibial spines dark with dark bases. Hemelytra: Corium including cuneus either uniformly pale green or brown, sometimes with orange tinge, or corium and cuneus brown and proximally with pale area, or cuneus entirely pale. Abdomen: Usually pale with green or yellow tinge, pygophore with dorsal surface either pale or dark brown. SURFACE AND VESTITURE: Dorsum weakly shining and with two types of setae: simple, semierect or erect, dark, and flattened, subadpressed, silvery setae in variable relative abundance, subadpressed setae with oblique ridges (fig. 4C–F). STRUCTURE: Head: Triangular or very short triangular in dorsal aspect with clypeus either indistinctly produced, slightly produced, or prominent, width of vertex variable, about as wide as one eye, slightly wider, or not as wide as one eye, clypeus slightly produced, mandibular plate not produced, maxillary plate large and either slightly or not sunken. Eye large or relatively large, as high as head or almost as high, emarginate posterior to fossa, posterolateral margin contiguous with anterolateral margins of pronotum. Antennal insertion contiguous with anterior margin of eye, segment 1 slender, moderately slender or very stout, surpassing or not reaching apex of head, segment 2 long and slender, moderately long and slender, or short and stout, diameter slightly increased toward apex or strongly tapering at both ends,

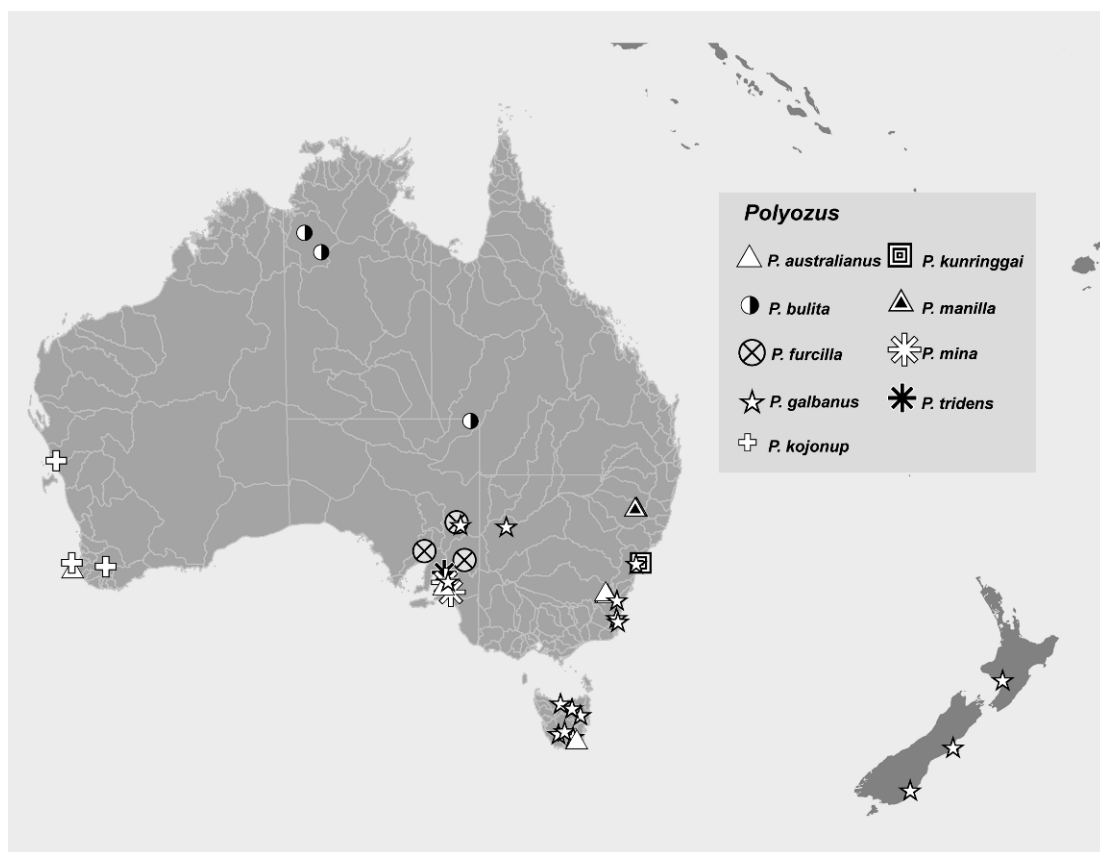


Fig. 17. Distribution of species of *Polyozus*.

segment 3 longer than segment 4. Labium slender, of variable length. Thorax: Pronotum either distinctly or only slightly wider than long, anterior margin slightly or very weakly sinuate, lateral margins almost straight, posterior margin straight, anterior and posterior lobes not demarcated, calli obsolete. Legs: Slender, claws (fig. 5C–F) slender and long or of moderate length and stoutness, pulvilli small or of moderate size, parempodia setiform. Hemelytra: Almost parallel, slightly convex, or convex, cuneus elongate triangular or triangular. Abdomen: Short, either slender or stout. GENITALIA: Pygophore (fig. 6F): Of moderate size, tapering. Parameres: Right paramere (figs. 6G, 7) short and broadly lanceolate, apex short, with subapical notch on anterior surface; left paramere (figs. 6G, 9) with anterior process short or of medium length and slender or moderately stout, posterior process short or long, slender,

bent ventrad and truncate at apex, body with short or large horizontal lobe. Phallosome (figs. 6G, 11): External portion tubular or irregularly tubular, tapering or only slightly tapering toward apex, anterior surface basally with shallow or large horizontal flange, distinctly serrate subapical lobe present or absent, posterior surface smooth or with weakly serrate very shallow flange, opening ventral, slitlike at base and extended toward apex or short and elongate ovate. Vesica (figs. 12, 13): J-shaped, of variable size, with dorsal and ventral apical processes forming anchor-shaped apex and additional median apical process in shape of tree or fork; dorsal apical process either truncate and fan-shaped, slender and elongate, blade-shaped, and with entire or serrate margin, and with or without squarish or triangular process on ventral surface of dorsal apical blade; ventral apical process long and slender, either connected to

ventral sclerotized strap of vesica or separated by membrane; secondary gonopore distal to middle of vesica, facing caudad; slender, short, straight process arising from proximal margin of secondary gonopore, usually bent left.

*Female*: Often somewhat smaller and more ovoid than the male, coloration lighter than or very similar to male, sexual dimorphism weak (e.g., *P. bulita*) to strong (e.g., *P. galbanus*). All species with posterior wall with fields of spicules and paired posterior processes, and dorsal labiate plate with paired areas with microtrichia (fig. 14).

**DISCUSSION**: *Polyozus* Eyles and Schuh, 2003 was described as a monotypic genus from New Zealand with *P. galbanus* as the type species. Eyles and Schuh (2003) listed *Acacia dealbata* and *A. baileyana* as its hosts, but also included one record from *Olearia ilicifolia* and one from hemlock; both are here regarded as sitting hosts. The authors did not mention that the two species of *Acacia* were introduced to New Zealand from Australia in the nineteenth century, with their original distribution being southeastern Australia (Webb, 1980). The presence of *Polyozus galbanus* in Australia, recorded herein, is therefore not surprising. In addition, *Melanotrichus australianus* Carvalho, 1965 is transferred to *Polyozus* (and with this from Orthotylinae to Phylinae), and seven new species of *Polyozus* from Australia are described.

#### KEY TO SPECIES OF *POLYOZUS*

1. Body ovoid, reddish brown (fig. 1, *P. bulita*).  
..... ***P. bulita*, n.sp.**
- Body elongate ovoid or elongate, rather uniformly pale green or pale orange, or pronotum pale green, with mesonotum orange, and scutellum pale green or orange (figs. 1, 2; e.g., *P. australianus*, *P. mina*) ..... 2
2. Uniformly pale green, sometimes with orange suffusion (fig. 2; e.g., *P. furcilla*, *P. kojonup*) ..... 3
- More varied coloration, with at least part of hemelytron suffused with brown (figs. 1, 2; e.g., *P. australianus*, *P. mina*) ..... 6
3. Size small to moderate (2.37–2.88) (fig. 2; *P. furcilla*, *P. tridens*) ..... 4
- Size large to very large (3.45–4.44) (fig. 2; *P. kojonup*) ..... 5
4. Vesica with only one small tooth in apical half of median apical process (fig. 12; *P. furcilla*)  
..... ***P. furcilla*, n.sp.**
- Vesica with two small teeth in apical half of median apical process (fig. 13; *P. tridens*).  
..... ***P. tridens*, n.sp.**
5. Vesica with fan-shaped dorsal apical process (fig. 13; *P. leeuwin*); body very large .....  
..... ***P. kojonup*, n.sp.**
- Vesica with blade-shaped dorsal apical process (fig. 13; *P. kurringai*), body large .....  
..... ***P. kurringai*, n.sp.**
6. Body elongate ovoid, pygophore pale dorsally ..... 7
- Body elongate, pygophore dark dorsally ..... 8
7. Vesica with blade-shaped dorsal apical process, appendage triangular (fig. 13; *P. manilla*).  
..... ***P. manilla*, n.sp.**
- Vesica with slender dorsal apical process, appendage squarish (fig. 13; *P. mina*) .....  
..... ***P. mina*, n.sp.**
8. Vesica with triangular appendage on dorsal apical process (fig. 12; *P. australianus*).  
..... *P. australianus* (Carvalho, 1965)
- Vesica with squarish appendage on dorsal apical process (fig. 13; *P. galbanus*) .....  
..... *P. galbanus* Eyles and Schuh, 2003

*Polyozus australianus* (Carvalho, 1965),  
new combination  
figures 1, 7, 9, 12, 17–20

*Melanotrichus australianus* Carvalho, 1965: 265–267 (n.sp.).

*Melanotrichus australianus* Carvalho, 1965: Cassis and Gross, 1995: 192 (cat.).

*Orthotylus australianus* (Carvalho, 1965): Schuh, 1995 (incertae sedis, Phylinae).

**REVISED DIAGNOSIS**: Recognized by the moderate size, elongate body, brown coloration with green pronotum and orange mesonotum and scutellum, dorsal surface of pygophore usually dark brown, and characters of the male genitalia, most notably the small vesica with dorsal apical process blade-shaped and with exterior margin weakly serrate, proximal process triangular, small, median apical process tree-shaped with numerous branches, weakly sclerotized, ventral apical process long and slender, not connected to strap of vesical body. Among species of *Polyozus*, habitus, coloration, and male genitalia most similar to *P. galbanus*, but distinguished, among others, by the smaller size, usually orange scutellum, and vesica with

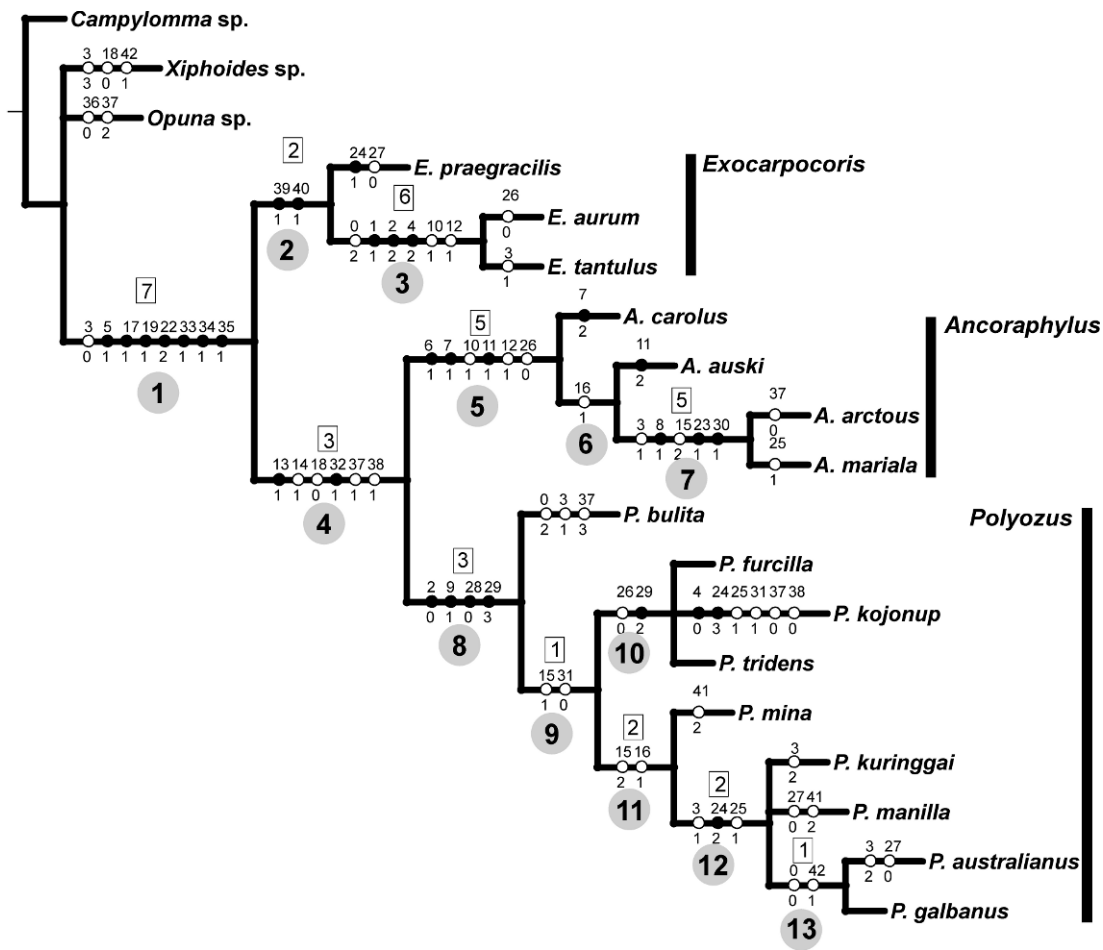


Fig. 18. Phylogenetic relationships of the 16 species of the *Polyozus* group: The strict consensus of the eight equally most parsimonious trees (L = 91; CI = 67; RI = 83) derived from the character matrix in table 3. Solid circles on the branches indicate uniquely derived apomorphic character states; empty circles indicate homoplastic characters under unambiguous character optimization. Figures above the bars indicate number of character as shown in table 2 and appendix 1; figures below bars indicate the character state. Large figures in shaded circles denominate clades. Branch support values (Bremer support) are given above branches in square boxes.

triangular process on dorsal apical blade; also similar to *P. manilla*, but distinguished by the darker coloration, more slender body shape, and more slender and elongate left paramere (in dorsal view) in *P. australianus*.

REVISED DESCRIPTION: *Male*: Of moderate size, elongate and slender (fig. 3E), total length 3.20–3.43, length apex clypeus–cuneal fracture 2.07–2.20, width across pronotum 0.93–1.04. COLORATION (fig. 1): Generally brown, with green pronotum, and orange mesonotum and scutellum. Head: Vertex dark

brown, fasciae indistinct, clypeus, mandibular and maxillary plates, gena and gula pale reddish brown, base of clypeus sometimes dark brown. Antennal segments pale reddish brown, first antennal segment often with subbasal dark ring. Labial segments pale reddish brown, darker brown toward apex. Thorax: Pronotum uniformly pale green, mesonotum orange or dark brown with paired orange marks, scutellum orange. Pleura pale green with mesopleuron at least ventrally, sometimes entirely, dark brown. Legs: Pale

with tarsi infusate, forecoxa sometimes dark brown ventrally, fore and middle femora with small brown spots and hindfemur with large brown spots, tibial spines dark with dark bases. *Hemelytra*: Corium including cuneus usually brown but sometimes fading to pale brown with green tinge, cuneus proximally with large pale area, membrane transparent to slightly infusate with orange veins and infusate area distal to corial margin. Abdomen: Pale green with dorsal surface of pygophore dark brown. **SURFACE AND VESTITURE**: Dorsum weakly shining, covered with stout, suberect, dark, simple setae, and flattened, subadpressed, silvery setae. **STRUCTURE**: Head: Head triangular in dorsal aspect, with prominent clypeus, vertex about as wide as one eye, maxillary plate sunken, eye large, as high as head. Antenna with antennal segment 1 slender and surpassing apex of head, segment 2 long and slender, slightly smaller diameter than segment 1, diameter not increased toward apex, segments 3 and 4 slender, segment 3 slightly longer than segment 4. Labium slender, apex of labium reaching apex of metacoxa. Thorax: Pronotum wider than long and anterior margin slightly sinuate; evaporatory area of metathoracic gland as in figure 3F. *Legs*: Claws slender and long, pulvilli small. *Hemelytra*: Almost parallel-sided, cuneus elongate triangular. Abdomen: Short and slender, just surpassing costal fracture. **GENITALIA**: Parameres: Right paramere, see figure 7; left paramere (fig. 9) with anterior process of medium length and thickness, posterior process long, slender, bent ventrad, and truncate at apex, body with large, almost horizontal lobe, slightly bent to the left. Phallosome (fig. 11): External portion irregularly tubular, tapering toward apex, anterior surface basally with large horizontal flange and distinctly serrate lobe subapically, posterior surface with weakly serrate small lobe, opening ventral, slitlike at base and extended toward apex. Vesica (fig. 12): Small, with dorsal apical process blade-shaped and with exterior margin weakly serrate, proximal process triangular, small, median apical process tree-shaped with numerous branches, weakly sclerotized, ventral apical process long and slender, not connected to strap of vesical body.

*Female*: Coloration slightly paler than in male, slightly smaller and less elongate than male. Total length 2.70–3.40, length apex clypeus–cuneal fracture 1.89–2.21, width across pronotum 0.94–1.06.

**HOST** (appendix 1): Recorded exclusively from *Acacia* (Fabaceae, Mimosoideae). Several records were not identified to species level, but some specimens were from *A. decurrens* Willd. and a large series was from *A. baileyana* F. Muell.

**DISTRIBUTION**: Known from the Australian Capital Territory, South Australia, Tasmania, and Western Australia (fig. 17).

**DISCUSSION**: Carvalho (1965) described this species as an Orthotyline in the genus *Melanotrichus*. Schuh (1995), synonymizing *Melanotrichus* with *Orthotylus*, subsumed it under the latter genus, but pointed out that *O. australianus* had an incertae sedis status, since it was “a member of the Phylinae based on illustrations of male genitalia”. The close resemblance of *P. australianus* to other species of the genus *Polyozus* justifies inclusion in this genus and therefore the transfer to Phylini, Phylinae.

Although this species appears very close to *P. galbanus* and has a partly overlapping distribution, it is distinct by a detail on the male vesica, the shape of the appendage on the dorsal apical process, and slightly different coloration. Possibly, *P. australianus* and *P. galbanus* are also restricted to different host plants; that is, most host records of *P. australianus* are from *A. baileyana* and *A. decurrens*, whereas those of *P. galbanus* are mostly from *A. dealbata* and *A. mearnsii*. Future collecting effort will test this hypothesis.

**SPECIMENS EXAMINED**: **AUSTRALIA**: **Australian Capital Territory**: Black Mountain, 35.26387°S 149.10051°E, 19 Nov 1985, G. Cassis, *Acacia decurrens* (Fabaceae), 7♂ (AMNH\_PBI 00088063, AMNH\_PBI 00087587–00087592), 5♀ (AMNH\_PBI 00087593–00087597) (AM). Canberra, 35.2833°S 149.2167°E, 605 m, 1973, J.C.M. Carvalho, 2♂ (AMNH\_PBI 00175102, AMNH\_PBI 00175103) (MNRJ). Ginninderra, 35.1652°S 149.0679°E, 03 Jan 1963, C.R. MacLellan, *Acacia* sp. (Fabaceae), 2♂ (AMNH\_PBI 00087714, AMNH\_PBI 00088011), 5♀ (AMNH\_PBI

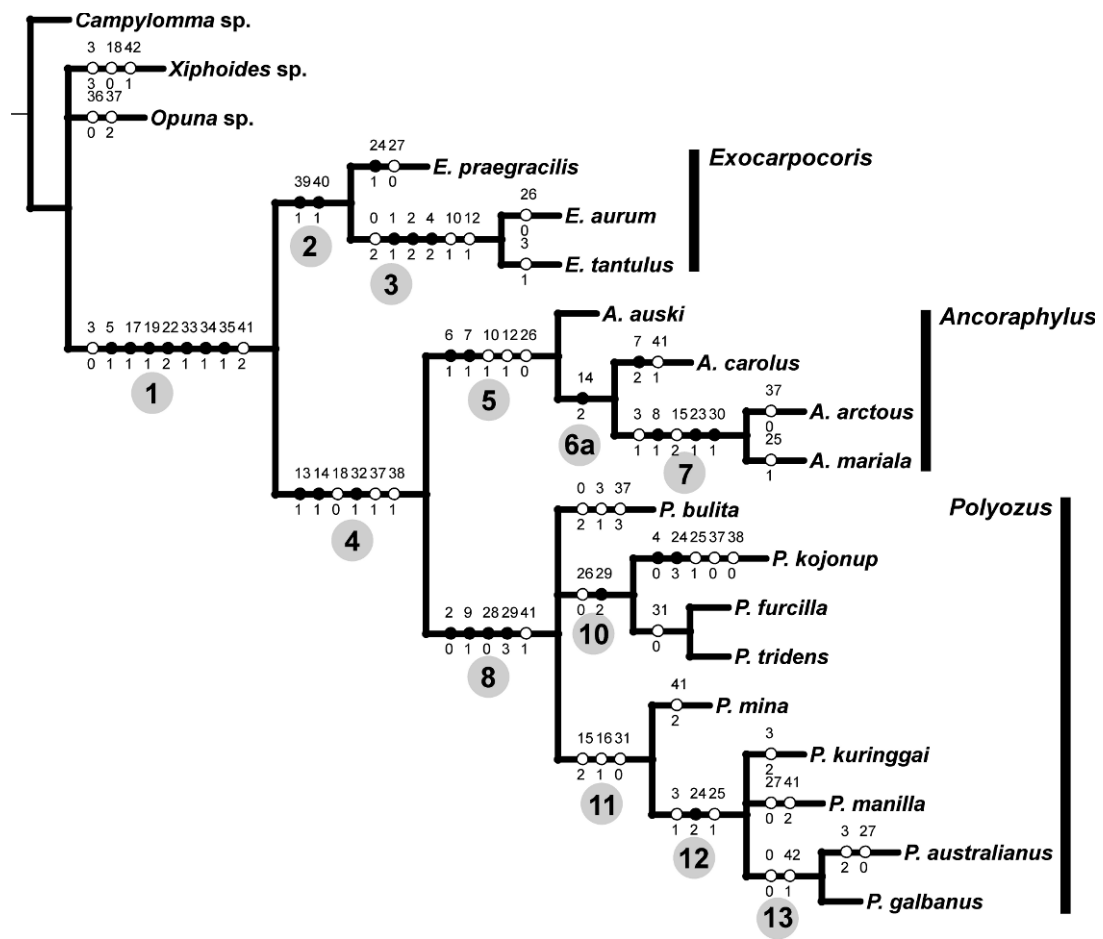


Fig. 19. Strict consensus of the two most parsimonious trees obtained with the analysis using implied weights. Characters and clades are shown as explained in figure 18.

00088014–00088018), 1 immature (AMNH\_PBI 00088019) (AM); 04 Feb 1963, C.R. MacLellan, apple, 2♀ (AMNH\_PBI 00088012, AMNH\_PBI 00088013) (AM). **South Australia:** Athelstone, 34.87116°S 138.70668°E, 07 Oct 1973, J.J.H. Szent-Ivany, Light Trap, 1♂ (AMNH\_PBI 00169055) (SAMA). **Tasmania:** Kingston, Welcome Inn grounds just E of A6, 42.96942°S 147.287°E, 120 m, 20 Jan 2004, M.D. Schwartz and P.P. Tinerella, *Acacia baileyana* F. Muell. (Fabaceae), det. NSW staff NSW658237, 4♂ (AMNH\_PBI 00194328–00194331), 4♀ (AMNH\_PBI 00194412–00194415) (AM). *Acacia baileyana* F. Muell. (Fabaceae), det. NSW staff NSW-

658237, 26♂ (AMNH\_PBI 00194332–00194357), 51♀ (AMNH\_PBI 00194361–00194411) (AMNH). *Acacia baileyana* F. Muell. (Fabaceae), det. NSW staff NSW658237, 1♂ (AMNH\_PBI 00194325), 1♀ (AMNH\_PBI 00194358) (CNC). *Acacia baileyana* F. Muell. (Fabaceae), det. NSW staff NSW658237, 1♂ (AMNH\_PBI 00194326), 1♀ (AMNH\_PBI 00194359) (USNM). *Acacia baileyana* F. Muell. (Fabaceae), det. NSW staff NSW 658237, 1♂ (AMNH\_PBI 00194327), 1♀ (AMNH\_PBI 00194360) (ZISP). **Western Australia:** Kevill Road, 4 km W of Margaret River, 33.94611°S 115.03666°E, 120 m, 02 Dec 1998, G. Cassis, *Acacia* sp. (Fabaceae), 25♂

(AMNH\_PBI 00088062, AMNH\_PBI 00087-598-00087621), 24♀ (AMNH\_PBI 00087622-00087645) (AM).

*Polyozus bulita*, new species  
figures 1, 4, 5, 7, 9, 11, 12, 17–20

**HOLOTYPE:** AUSTRALIA: Northern Territory: Bullock Creek, Camfield Homestead, 17.1°S 131.25°E, 17 Aug 1982–20 Aug 1982, I. Archibald, Light Trap, 1♂ (AMNH\_PBI 00088030) (AM).

**DIAGNOSIS:** Recognized by the large size (2.86–3.51), stout and ovoid body, reddish brown coloration, and characters of the male genitalia, most notably the small vesica with dorsal apical process long, slender, and acute, without serration, proximal process squarish, slender and elongate, median apical process weakly sclerotized, tree-shaped with several branches, and ventral apical process long and slender, connected to strap of vesical body by broad sclerotized strap. Distinguished from all other species of *Polyozus* by the stout ovoid body shape, the short and stout antennal segment 2, and the reddish brown coloration.

**DESCRIPTION:** *Male:* Large (2.86–3.51), ovoid and stout, length apex clypeus–cuneal fracture 2.15–2.31, width across pronotum 1.21–1.37. **COLORATION** (fig. 1): General coloration light brown with red tinge. **Head:** Vertex pale with six red fasciae, the most posterior fascia large, base of clypeus with red mark, clypeus with paired, longitudinal red stripes, mandibular and maxillary plates, gena, and gula pale with red suffusion. Antennal segments pale, segment 1 suffused with red, and segment 4 slightly infuscate. Labial segments pale, segment 1 suffused with red, labium infuscate toward apex. **Thorax:** Pronotum light brown with red suffusion, with anterior margin very pale, almost white, red suffusion most prominent on calli; mesonotum and scutellum red with apex of scutellum pale or white. Pleura pale with extensive red suffusion, mesepisternum mostly red, evaporatory area mostly pale. **Legs:** Pale with bases of coxae suffused with red, red spots on femora, similarly distributed on the three pairs of legs, tibial spines dark, with indistinct dark

bases, tarsi infuscate. **Hemelytra:** Corium light brown, almost translucent, with red suffusion, exocorium and cuneus red, cuneus with narrow proximal area pale, membrane translucent, cells and area distal to cuneus only weakly infuscate. **Abdomen:** Mostly dark red or reddish brown, with small pale areas, especially on lateral margins of anterior sternites and on pygophore. **SURFACE AND VESTITURE:** Dorsum weakly shining, densely covered with adpressed, flattened, silvery or dark brown setae, scattered suberect, stout, dark, simple setae, especially on pronotal margins (fig. 4C). **STRUCTURE:** **Head:** Very short triangular, much wider than long, vertex not as wide as width of one eye, clypeus not distinctly produced, maxillary plate large and not sunken, eye large, as high as head, and much longer dorsally than ventrally. Antennal segment 1 very stout and short, not surpassing apex of head, segment 2 short and stout, tapering at both ends, segments 3 and 4 very slender compared to segment 2, segment 3 longer than segment 4. Labium slender, just reaching base of metacoxa. **Thorax:** Pronotum wider than long, anterior margin very weakly sinuate. **Legs:** Claws of moderate length, slender, and moderate-sized pulvilli (fig. 5C). **Hemelytra:** Convex laterally, cuneus elongate triangular. **Abdomen:** Stout, reaching to about middle of cuneus. **GENITALIA:** **Parameres:** Right paramere, see figure 7; left paramere (fig. 9) with anterior process short and slender, posterior process long, slender, bent ventrad, and truncate at apex, body with short but distinct, almost horizontal lobe. **Phallosheca** (fig. 11): External portion tubular with tapering apex, anterior surface basally with shallow horizontal flange, no serrate lobes, opening ventral, short, elongate ovate. **Vesica** (fig. 12): Small, with dorsal apical process long, slender, and acute, without serration, proximal process squarish, slender and elongate, median apical process tree-shaped with several branches, weakly sclerotized, ventral apical process long and slender, connected to strap of vesical body by broad sclerotized strap.

*Female:* Coloration, size, and shape similar to male. Total length 3.11–3.22, length apex clypeus–cuneal fracture 2.13–2.48, width across pronotum 1.30–1.41.

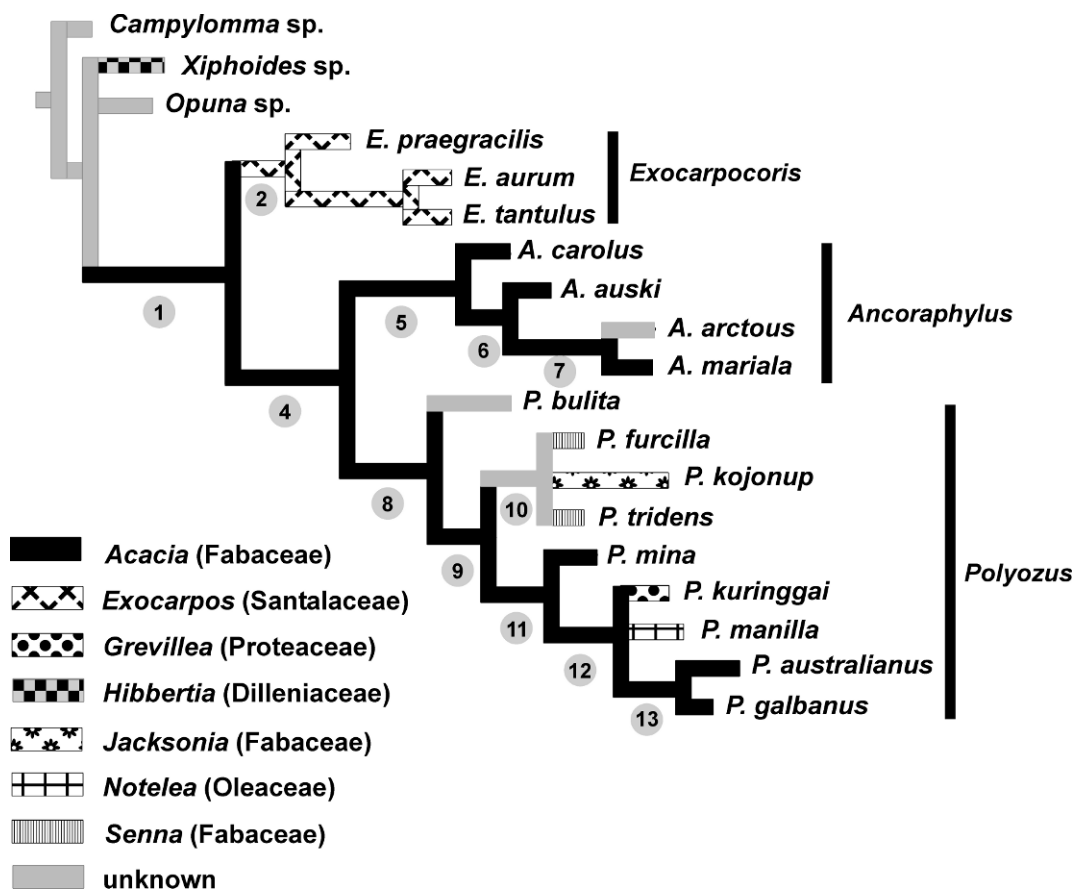


Fig. 20. Fast optimization of host plants of Phylini of the *Polyozus* group on the strict consensus of the unweighted analysis.

**ETYMOLOGY:** Named for one of the collecting sites, Bulita outstation in the Northern Territory.

**HOST:** Unknown, collected at light.

**DISTRIBUTION:** Known from three collecting events, two in the Northern Territory and one in South Australia close to the boarder of the Northern Territory. This species seems to be restricted to the dry interior of Australia (fig. 17).

**DISCUSSION:** Although the male genitalia unambiguously associates this species with the remaining species of *Polyozus*, *P. bulita* is distinct from all other species of the genus *Polyozus* by its different body shape (ovoid) and distinct coloration (brown and reddish, rather than green). The cladistic analysis presented here treats *P. bulita* as the sister

group to all remaining species of *Polyozus* (figs. 18, 19).

**PARATYPES: AUSTRALIA: Northern Territory:** Bulita outstation, 16.07°S 130.25°E, 22 Jun 1986–03 Jul 1986, M. Malipatil, Light Trap, 15 ♂ (AMNH\_PBI 00168429–00168443, AMNH\_PBI 00087652), 3 ♀ (AMNH\_PBI 00168444–00168446) (MAGD). Bullock Creek, Camfield Homestead, 17.1°S 131.25°E, 17 Aug 1982–20 Aug 1982, I. Archibald, Light Trap, 19 ♂ (AMNH\_PBI 00088020–PBI 00088029, AMNH\_PBI 00088031–00088039), 13 ♀ (AMNH\_PBI 00088048–00088060) (AM). Light Trap, 5 ♂ (AMNH\_PBI 00088040–00088043, AMNH\_PBI 00139099), 4 ♀ (AMNH\_PBI 00088044–PBI 00088047) (AMNH). **South Australia:** Cadelga Homestead, 26.08949°S 140.4106°E, 150 m, 04 Nov

1998, Schuh, Cassis, Silveira, 1 ♂ (AMNH\_PBI 00087709) (AM).

*Polyozus furcilla*, new species  
figures 2, 4, 5, 7, 9, 11, 12, 17–20

**HOLOTYPE:** AUSTRALIA: South Australia: 14.3 km S of Erudina Woolshed, 31.53334°S 139.5506°E, 86 m, 09 Nov 2001, Cassis, Schuh, Schwartz, *Senna* form taxon '*coriacea*' (Fabaceae), det. NSW staff NSW666376, 1 ♂ (AMNH\_PBI 00099438) (AM).

**DIAGNOSIS:** Recognized by the smallish size, elongate ovoid body, large vesica, tubular dorsal apical process without proximal process, ventral apical process almost straight, not connected to strap of vesical body, median apical process well sclerotized, consisting of one stem with one small tooth on apical half. Habitus and genitalia very similar to *P. tridens*, but distinguished by the structure of the vesica, the median apical process with only one tooth on apical half.

**DESCRIPTION:** *Male:* Small (2.64–2.88) and elongate ovoid, length apex clypeus–cuneal fracture 1.74–1.7, width across pronotum 0.88–0.95. **COLORATION** (fig. 2): General coloration pale green with orange tinge. **Head:** Uniformly orange, fasciae on vertex indistinct. Antennal segments pale and gradually infusate toward apex, brown ring subbasally on segment 1. Labium pale, infusate toward apex. **Thorax:** Pronotum pale green with orange tinge, mesonotum and scutellum orange. Pleura pale orange. **Legs:** Uniformly pale with tarsi infusate, very small dark spots on femora, tibial spines dark with very small dark bases. **Hemelytra:** Corium and cuneus uniformly pale orange, membrane pale, anterior cell slightly infusate, veins yellowish. **Abdomen:** Pale with greenish tinge. **SURFACE AND VESTITURE:** Dorsum weakly shining, densely covered with moderately stout, suberect, dark, simple setae, and more scattered, flattened, adpressed, silvery setae (fig. 4D). **STRUCTURE:** **Head:** Short, vertex slightly wider than width of one eye, clypeus slightly produced, maxillary plate sunken; eye large, as high as head, emarginate posterior to antennal fossa. Antennal segment 1 moderately slender and slightly surpassing

apex of head, segment 2 of moderate length and diameter, slightly smaller diameter than segment 1, segments 3 and 4 slender, segment 3 slightly longer than segment 4. Labium slender, apex of labium surpassing base of mesocoxa. **Thorax:** Pronotum wider than long and anterior margin slightly sinuate. **Legs:** Claws slender and of moderate length, pulvilli of moderate size (fig. 5D). **Hemelytra:** Slightly convex laterally, cuneus elongate triangular. **Abdomen:** Stout, reaching to about middle of cuneus. **GENITALIA:** **Parameres:** Right paramere, see figure 7; left paramere with short, slender anterior process, posterior process long, slender, bent ventrad, and slightly truncate at apex, body with large, straight, almost horizontal lobe (fig. 9). **Phallosome:** External portion irregularly tubular, only slightly tapering toward truncate apex, anterior surface basally with large horizontal flange, opening ventral, slitlike at base and extended toward apex. **Vesica:** Large, with tubular dorsal apical process without proximal process, ventral apical process almost straight, not connected to strap of vesical body, median apical process well sclerotized, consisting of one stem with one small tooth in apical half.

*Female:* Coloration slightly more faded than in male, slightly smaller than male. Total length 2.52–2.73, length apex clypeus–cuneal fracture 1.62–1.74, width across pronotum 0.82–0.95.

**ETYMOLOGY:** Named for the shape of the median apical process of the vesica, which resembles a fork, after Latin noun "*furcilla*" (f.) meaning little fork.

**HOST** (appendix 1): Most specimens were recorded from species of *Senna* (Fabaceae, Caesalpinioideae) during three collecting events, with one record of three specimens from *Eremophila* (Myoporaceae) probably representing a sitting record.

**DISTRIBUTION:** Known from three collecting sites in South Australia (fig. 17).

**DISCUSSION:** This species is closely related to *P. tridens* based on habitus and male genitalia (e.g., the strongly sclerotized median apical process in the vesica), but it appears to be distinct based on the fine structure of the median process, which is forked in *P. furcilla* and shaped as a trident in *P. tridens*.

**PARATYPES: AUSTRALIA: South Australia:** 14.3 km S of Erudina Woolshed, 31.53334°S 139.5506°E, 86 m, 09 Nov 2001, Cassis, Schuh, Schwartz, *Senna* form taxon '*coriacea*' (Fabaceae), det. NSW staff NSW666376, 4♂ (AMNH\_PBI 00099439–00099442) (AM). *Senna* form taxon '*coriacea*' (Fabaceae), det. NSW staff NSW666376, 34♂ (AMNH\_PBI 00099409–00099437, AMNH\_PBI 00099443–00099447), 57♀ (AMNH\_PBI 00099448–00099504) *Eremophila sturtii* R. Br. (Myoporaceae), det. NSW staff NSW666375, 1♂ (AMNH\_PBI 00099298), 2♀ (AMNH\_PBI 00099299, AMNH\_PBI 00099300) (AMNH). 5 km SW of Whyalla, 33.05085°S 137.5004°E, 30 m, 21 Oct 1996, Schuh and Cassis, *Senna glutinosa* (DC.) Randell (Fabaceae), det. PERTH staff 05056497, 6♂ (AMNH\_PBI 00136729–00136734), 13♀ (AMNH\_PBI 00136735–00136747) (AMNH). 75 km NW of Morgan, 5 km N Cane Grass, 33.53334°S 140.05°E, 100 m, 02 Nov 1995, Schuh, Cassis, and Gross, *Senna artemisioides* ssp. *coriacea* (DC.) Randell (Fabaceae), det. B.M. Wiecek 1996 NSW 395974, 2♂ (AMNH\_PBI 00090624, AMNH\_PBI 00128747), 11♀ (AMNH\_PBI 00128748–00128758) *Senna artemisioides* ssp. *coriacea* (DC.) Randell (Fabaceae), det. B.M. Wiecek 1996 NSW 395974, 2♂ (AMNH\_PBI 00090624, AMNH\_PBI 00128747), 11♀ (AMNH\_PBI 00128748–00128758) (AM).

*Polyozus galbanus*, Eyles and Schuh, 2003  
figures 2, 4, 5, 7, 9, 11, 13, 14, 17–20

*Polyozus galbanus* Eyles and Schuh, 2003: 304 (n.sp.)

**MODIFIED DIAGNOSIS:** Recognized by the large size, elongate body, dark brown coloration with green pronotum and scutellum and orange mesonotum, small vesica, with dorsal apical process blade-shaped and with exterior margin weakly serrate, proximal process square, large, median apical process tree-shaped with numerous branches, weakly sclerotized, ventral apical process long and slender, not connected to strap of vesical body. Habitus similar to *P. australianus*, but distinguished by the coloration of the scutellum and the shape of the proximal process on the dorsal apical process; vesica similar to *P. mina*, but distinguished by the serrate, blade-

shaped dorsal apical process, and similar to *P. kurringai*, but distinguished by the smaller size of the vesica, apart from the general coloration.

**REDESCRIPTION:** *Male:* Large (3.51–3.86), elongate and slender, length apex clypeus–cuneal fracture 2.24–2.46, width across pronotum 1.03–1.11. **COLORATION** (fig. 2): General coloration brown, with green pronotum and scutellum, and orange mesonotum. **Head:** Uniformly greenish yellow, fasciae indistinct. Antenna pale brown, infusate toward apex, segment 1 with subbasal dark ring. Labium pale, infusate toward apex. **Thorax:** Pronotum uniformly green with yellow tinge, mesonotum orange, scutellum pale green with apex pale. Pleura pale green and yellow. **Legs:** Pale with tarsi infusate, fore and middle femora with small brown spots and hindfemur with large brown spots; tibial spines dark with dark bases. **Hemelytra:** Corium brown with clavus and distal part of exocorium brown, cuneus pale, distally slightly suffused with orange and with proximal area clear, membrane transparent to slightly infusate, with anterior cell distinctly infusate, veins orange. **Abdomen:** Pale green with dorsal surface of pygophore dark brown. **SURFACE AND VESTITURE:** Dorsum weakly shining, densely covered with moderately stout, suberect, dark, simple setae, and more scattered, flattened, adpressed, silvery setae (fig. 4E). **STRUCTURE:** **Head:** Triangular in dorsal aspect, vertex about as wide as one eye, clypeus slightly produced, maxillary plate sunken, eye large, as high as head. Antennal segment 1 slender and surpassing apex of head, segment 2 long and slender, slightly smaller in diameter than segment 1, diameter slightly increased toward apex, segments 3 and 4 slender, segment 3 more than twice as long as segment 4. Labium slender, apex reaching base of metacoxa. **Thorax:** Pronotum wider than long and anterior margin slightly sinuate. **Legs:** Claws of moderate length and stoutness and pulvilli of moderate size (fig. 5E). **Hemelytra:** Almost parallel-sided, cuneus elongate triangular. **Abdomen:** Short and slender, just surpassing costal fracture. **GENITALIA:** **Parameres:** Right paramere, see figure 7; left paramere (fig. 9) with anterior process of medium length and thickness, posterior pro-

cess long, slender, bent ventrad, and truncate at apex, body with large, almost horizontal lobe, slightly bent to the left. *Phallotheca* (fig. 11): External portion irregularly tubular, tapering toward apex, anterior surface basally with large horizontal flange and distinct serrate lobe subapically, posterior surface with weakly serrate, very shallow flange, opening ventral, slitlike at base and extended toward apex. *Vesica* (fig. 13): Small, with dorsal apical process blade-shaped and with exterior margin weakly serrate; proximal process square, large; median apical process tree-shaped with numerous branches, weakly sclerotized; ventral apical process long and slender, not connected to strap of vesical body.

*Female*: Paler coloration than male, distinctly shorter and more ovoid body shape than male. Total length 2.90–3.63, length apex clypeus–cuneal fracture 1.90–2.37, width across pronotum 0.99–1.24. Female genitalia as in figure 14.

*Host* (appendix 1): Recorded predominantly from *Acacia dealbata* and *A. mearnsii* (Fabaceae, Mimosoideae). Eyles and Schuh (2003) provided additional host records from *Acacia dealbata*, *A. baileyana*, an undetermined species of *Acacia*, and two sitting records on *Olearia* (Asteraceae) and hemlock (Apiaceae) in New Zealand.

*DISTRIBUTION*: Recorded from New South Wales, South Australia, and Tasmania (fig. 17). The type locality is Outram, Dunedin, in New Zealand, but Eyles and Schuh (2003) recorded this species from numerous additional sites in New Zealand (fig. 17). The original distribution of *P. galbanus* is here assumed to be Australia including Tasmania, since its primary host plants, *Acacia dealbata* and *A. baileyana*, were introduced to New Zealand in the 1870s (Webb, 1980) from their endemic range in southeastern Australia and Tasmania. The occurrence of *P. galbanus* in New Zealand can therefore possibly be attributed to human-induced dispersal of its host plant (e.g., as eggs embedded in the stems of the host plants).

*DISCUSSION*: This species is closely related to *P. australianus* (Carvalho) judging from habitus and male genitalic features, but it is distinguished by coloration and by the shape of the appendage on the dorsal apical process.

*SPECIMENS EXAMINED*: *PARATYPES*: **NEW ZEALAND**: **Dunedin**: Outram, 45.86666°S 170.23333°E, 11 Dec 1998, A.C. Eyles, wattle, 1 ♂ (AMNH\_PBI 00139094) (AMNH). Christchurch, 43.53333°S 172.66667°E, 01 Dec 1998, A.C. Eyles and R.P. Macfarlane, *Racosperma dealbatum* (Fabaceae), 1 ♂ (AMNH\_PBI 00139095), 1 ♀ (AMNH\_PBI 00139097) (AMNH). Kowhai Bush, 39.916°S 175.266°E, 18 Dec 1998, A. C. Eyles, *Racosperma* sp. (Fabaceae), 1 ♀ (AMNH\_PBI 00139096) (AMNH).

*OTHER SPECIMENS EXAMINED*: **AUSTRALIA**: **New South Wales**: 119.9 km E of Broken Hill on Barrier Highway, 31.71668°S 142.6912°E, 231 m, 10 Nov 2001, Cassis, Schuh, Schwartz, 1 ♂ (AMNH\_PBI 00139061) (AMNH). 17 km N of Bega, 36.58334°S 149.8333°E, 50 m, 10 Nov 1995, Schuh and Cassis, *Acacia mearnsii* De Wild. (Fabaceae), det. B.J. Conn 1996 NSW 395993, 4 ♂ (AMNH\_PBI 00139049–00139052), 2 ♀ (AMNH\_PBI 00139053, AMNH\_PBI 00139054) (AMNH). 65 km N of Sydney on Pacific Highway, 33.53334°S 151.1833°E, 100 m, 19 Oct 1995, Schuh and Cassis, *Acacia mearnsii* De Wild. [introduced] (Fabaceae), det. B.J. Conn 1996 NSW 395901, 2 ♂ (AMNH\_PBI 00139055, AMNH\_PBI 00139056), 4 ♀ (AMNH\_PBI 00139057–00139060) (AMNH). Araluen, 35.65001°S 149.8167°E, 50 m, 11 Nov 1995, Schuh and Cassis, *Acacia mearnsii* De Wild. (Fabaceae), det. B.J. Conn 1996 NSW 395993, 2 ♂ (AMNH\_PBI 00087707, AMNH\_PBI 00087708) (AM). Bournda National Park, North Wallagoot, Turingal Head, 36.78452°S 149.9568°E, 16 m, 20 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Acacia mearnsii* De Wild. (Fabaceae), det. NSW staff NSW658198, 7 ♂ (AMNH\_PBI 00139081–00139087), 4 ♀ (AMNH\_PBI 00139088–00139091) (AMNH). Ermington, 12 Nov 1958, P.M. Goodwin, 1 ♂ (AM). **South Australia**: 1 km S of Riverton, 34.16667°S 138.75°E, 250 m, 30 Oct 1995, Schuh and Cassis, *Acacia mearnsii* De Wild. (Fabaceae), det. B.J. Conn 1996 NSW 395959, 4 ♂ (AMNH\_PBI 00131645–00131648), 10 ♀ (AMNH\_PBI 00131651–00131660) (AMNH). 14.3 km S of Erudina Woolshed, 31.53334°S 139.5506°E, 86 m, 09 Nov 2001, Cassis, Schuh, Schwartz, *Senna* form taxon '*petiolaris*' (Fabaceae), det. NSW staff 666374, 2 ♂

(AMNH\_PBI 00139062, AMNH\_PBI 00139064) *Eremophila sturtii* (Fabaceae), det. NSW staff 666375, 1 ♂ (AMNH\_PBI 00139063) (AMNH). **Tasmania:** 7 km W of Southwest National Park (Maydena access): intersection of Frodsham's Pass and Gordon River Rd, 42.82103°S 146.31018°E, 306 m, 18 Jan 2004, M.D. Schwartz and P.P. Tinerella, *Acacia dealbata* Link (Fabaceae), det. NSW staff NSW658224, 6 ♂ (AMNH\_PBI 00194274–00194279), 1 ♀ (AMNH\_PBI 00194280) (AMNH). Avoca Picnic Area, just NW of A4, 41.78387°S 147.7182°E, 197 m, 27 Jan 2004, M.D. Schwartz and P.P. Tinerella, *Acacia dealbata* subsp. *dealbata* Link (Fabaceae), det. NSW staff 658267, 18 ♂ (AMNH\_PBI 00194416–00194433), 7 ♀ (AMNH\_PBI 00194434–00194440) (AMNH). Devonport, Stoney Rise, 41.17801°S 146.35871°E, 70 m, 11 Jan 1995, L. Hill, Light Trap, 1 ♂ (AMNH\_PBI 00088061) (AM). Kingston, Welcome Inn grounds just E of A6, 42.96942°S 147.287°E, 120 m, 20 Jan 2004, M.D. Schwartz and P.P. Tinerella, *Acacia baileyana* F. Muell. (Fabaceae), det. NSW staff 658237, 3 ♂ (AMNH\_PBI 00194322–00194324) *Acacia dealbata* subsp. *dealbata* Link (Fabaceae), det. NSW staff 658235, 25 ♂ (AMNH\_PBI 00194281–00194305), 16 ♀ (AMNH\_PBI 00194306–00194321) (AMNH). Launceston, 41.43611°S 147.14645°E, [collector and date unknown], 1 ♂ (AMNH\_PBI 00169054) (SAMA). Mt. Field National Park, Russell Falls Visitor Centre, 42.68151°S 146.7168°E, 167 m, 16 Jan 2004, M.D. Schwartz and P.P. Tinerella, *Acacia dealbata* subsp. *dealbata* Link (Fabaceae), det. NSW staff 658219, 8 ♂ (AMNH\_PBI 00194226–00194233), 6 ♀ (AMNH\_PBI 00194256–00194261) (AM). *Acacia dealbata* subsp. *dealbata* Link (Fabaceae), det. NSW staff 658219, 17 ♂ (AMNH\_PBI 00194234–00194250), 17 ♀ (AMNH\_PBI 00194251–00194255, AMNH\_PBI 00194262–00194273) (AMNH).

*Polyozus kojonup*, new species  
figures 2–7, 9, 11, 13, 17–20

**HOLOTYPE:** AUSTRALIA: **Western Australia:** 3 km S of Kojonup, Sampson Road, 33.87088°S 117.1648°E, 310 m, 08 Dec 1997, Schuh, Cassis, Brailovsky, Asquith, *Jacksonia*

*sternbergiana* Hueg. (Fabaceae), det. PERTH staff 05879132, 1 ♂ (AMNH\_PBI 00136469) (WAMP).

**DIAGNOSIS:** Recognized by the very large size (3.97–4.44), elongate and slightly ovoid body (fig. 3E), rather uniformly yellowish green coloration, and characters of the male genitalia, most notably the large vesica with short and truncate, fan-shaped dorsal apical process without proximal process, ventral apical process almost straight, median apical process consisting of one weakly sclerotized stem with only few very short apical branches. Habitus most similar to *P. kurringai*, but distinguished by the male genitalia. Coloration similar to *P. furcilla* and *P. tridens*, but distinguished by the much larger body size in *P. kojonup*.

**DESCRIPTION:** *Male:* Very large (3.97–4.44) and elongate ovoid, length apex clypeus–cuneal fracture 2.60–2.83, width across pronotum 1.18–1.27. **COLORATION** (fig. 2): General coloration pale yellowish green. **Head:** Uniformly greenish yellow, fasciae indistinct. Antenna pale, infusate toward apex, subbasal dark ring on segment 1 obsolete. Labium pale, infusate toward apex. **Thorax:** Pronotum and scutellum uniformly yellowish green, mesonotum with orange tinge. Pleura greenish yellow. **Legs:** Legs uniformly pale with tarsi infusate, tibial spines dark with pale bases. **Hemelytra:** Corium and cuneus uniformly greenish yellow, membrane clear to slightly smoky, veins pale orange. **Abdomen:** Pale green, gradually turning to greenish yellow toward pygophore, dorsal surface of pygophore pale. **SURFACE AND VESTITURE:** Dorsum shining, vestiture consisting of about equally abundant dark, suberect, simple setae and flattened, subadpressed, silvery setae (fig. 4F). **STRUCTURE:** **Head:** Very short triangular in dorsal aspect, antocular portion short, vertex slightly wider than one eye, clypeus produced, and maxillary plate sunken, eye large, as high as head. Antennal segment 1 slender and surpassing apex of head, segment 2 long and slender, slightly smaller in diameter than segment 1, diameter slightly increased toward apex, segments 3 and 4 slender, segment 3 much longer than segment 4. Labium slender, apex of labium only reaching base of mesocoxa. **Thorax:**

Pronotum only slightly wider than long, anterior margin slightly sinuate; evaporatory area of metathoracic gland as in figure 3F. *Legs*: Claws of moderate length and stoutness and pulvilli of moderate size (fig. 5F). *Hemelytra*: Slightly convex, cuneus elongate triangular. *Abdomen*: Stout, reaching to about middle of cuneus. **GENITALIA**: *Pygophore*: See figure 6F. *Parameres*: Right paramere as in figures 6G, 7; left paramere (figs. 6G, 9) with anterior process short and moderately stout, posterior process short, tapering, bent ventrad, truncate at apex, body with horizontal lobe of moderate size. *Phallosheca* (figs. 6G, 11): External portion tubular, tapering toward apex, anterior surface basally with large lobe and shallow subapical flange, posterior surface smooth, opening ventral, subapical, elongate ovate. *Vesica* (fig. 13): Large, with short and truncate, fan-shaped dorsal apical process without proximal process, ventral apical process almost straight, median apical process consisting of one weakly sclerotized stem with only few very short apical branches.

*Female*: Coloration similar to male, somewhat smaller and more ovoid than male. Total length 3.66–4.19, length apex clypeus–cuneal fracture 2.47–2.77, width across pronotum 1.16–1.32.

**ETYMOLOGY**: Named for the type locality.

**Host** (appendix 1): Recorded from *Jacksonia cupulifera* Meisn., *J. horrida* DC., and *J. sternbergiana* Hueg. (Fabaceae, Papilionoideae).

**DISTRIBUTION**: Known from three localities in the south of Western Australia (fig. 17).

**DISCUSSION**: This species appears to be most closely related to *P. furcilla* and *P. tridens* (based on the cladistic analysis; figs. 18, 19), which it resembles in coloration and in some characteristics of the male genitalia.

**PARATYPES**: **AUSTRALIA: Western Australia**: 15 km NW of Northampton, on Port Gregory Rd (toward Gregory), 28.30029°S 114.5096°E, 167 m, 22 Oct 2004, Cassis, Wall, Weirauch, Symonds, *Jacksonia cupulifera* Meisn. (Fabaceae, Papilionoideae), det. PERTH staff 6989640, 7♂ (AMNH\_PBI 00090627, AMNH\_PBI 00090628, AMNH\_PBI 00090628, AMNH\_PBI 00090629,

AMNH\_PBI 00090629–00090631), 10♀ (AMNH\_PBI 00090630–00090632, AMNH\_PBI 00090632, AMNH\_PBI 00090633, AMNH\_PBI 00090633, AMNH\_PBI 00090634, AMNH\_PBI 00090634–00090636) (AM). *Jacksonia cupulifera* Meisn. (Fabaceae, Papilionoideae), det. PERTH staff 6989640, 2♂ (AMNH\_PBI 00090625, AMNH\_PBI 00090626), 4♀ (AMNH\_PBI 00090637–00090640) (WAMP). 3 km S of Kojonup, Sampson Road, 33.87088°S 117.1648°E, 310 m, 08 Dec 1997, Schuh, Cassis, Brailovsky, Asquith, *Jacksonia sternbergiana* Hueg. (Fabaceae, Papilionoideae), det. PERTH staff 05879132, 3♂ (AMNH\_PBI 00136461, AMNH\_PBI 00136462, AMNH\_PBI 00136464), 7♀ (AMNH\_PBI 00136492–00136498) (AM). *Jacksonia sternbergiana* Hueg. (Fabaceae, Papilionoideae), det. PERTH staff 05879132, 5♂ (AMNH\_PBI 00136463, AMNH\_PBI 00136467, AMNH\_PBI 00136468, AMNH\_PBI 00136470, AMNH\_PBI 00136471), 10♀ (AMNH\_PBI 00136475–00136484) (AMNH). *Jacksonia sternbergiana* Hueg. (Fabaceae, Papilionoideae), det. PERTH staff 05879132, 2♂ (AMNH\_PBI 00136465, AMNH\_PBI 00136466), 7♀ (AMNH\_PBI 00136485–00136491) (WAMP). Leeuwin Naturaliste National Park, Canal Rocks, 33.66513°S 115.0165°E, 50 m, 15 Dec 1997, Schuh, Cassis, Brailovsky, Asquith, *Jacksonia horrida* DC. (Fabaceae, Papilionoideae), det. PERTH staff 05056314, 1♂ (AMNH\_PBI 00131176), 4♀ (AMNH\_PBI 00131178–00131181) (AMNH). *Jacksonia horrida* DC. (Fabaceae, Papilionoideae), det. PERTH staff 05056314, 1♂ (AMNH\_PBI 00131177) (WAMP).

*Polyozus kuringgai*, new species  
figures 2, 7, 9, 11, 13, 17–20

**HOLOTYPE**: **AUSTRALIA: New South Wales**: Ku-Ring-Gai Chase National Park, McCarrs Creek, West Head Rd., 33.66668°S 151.25°E, 100 m, 14 Oct 1995, Schuh and Cassis, *Grevillea buxifolia* (Sm.) R.Br. (Proteaceae), 1♂ (AMNH\_PBI 00132267) (AM).

**DIAGNOSIS**: Recognized by the large size, elongate and slightly ovoid body, uniformly pale yellowish green coloration, and characters of the male genitalia, most notably the

large vesica, with dorsal apical process blade-like, with serration on exterior surface, process of square shape, median apical process tree-shaped with numerous branches. Habitus similar to *P. mina*, but distinguished by vestiture and male genitalia, vesica most similar to *P. galbanus* and *P. mina*, but distinguished from both by the larger size of the vesica and distinguished from *P. mina* by the serration on the dorsal apical blade.

**DESCRIPTION:** *Male:* Large (3.45–3.89), elongate ovoid, length apex clypeus–cuneal fracture 2.12–2.47, width across pronotum 1.07–1.19. **COLORATION** (fig. 2): General coloration very pale yellowish green, yellow suffusion most prominent on pronotum, mesonotum, and scutellum. **Head:** Uniformly greenish yellow, fasciae indistinct. Antenna pale, infusate toward apex, segment 1 with subbasal dark ring. Labium pale, infusate toward apex. **Thorax:** Pronotum, mesonotum, and scutellum uniformly pale yellowish green, apex of scutellum pale. Pleura pale greenish yellow. **Legs:** Legs pale with tarsi infusate, all femora with small brown spots, tibial spines dark with irregular dark bases. **Hemelytra:** Corium and cuneus uniformly pale greenish yellow, membrane clear, sometimes with anterior cell and patch distal to cells infusate, veins pale orange. **Abdomen:** Pale green, gradually turning to greenish yellow toward pygophore, dorsal surface of pygophore pale. **SURFACE AND VESTITURE:** Dorsum weakly shining, densely covered with moderately stout, suberect, dark, simple setae, and flattened, adpressed, silvery setae, the two types of setae of similar abundance. **STRUCTURE:** **Head:** Triangular in dorsal aspect, vertex slightly wider than one eye, clypeus produced, and maxillary plate sunken, eye large, almost as high as head. Antennal segment 1 slender and surpassing apex of head, segment 2 long and slender, slightly smaller diameter than segment 1, diameter slightly increased toward apex, segments 3 and 4 slender, segment 3 longer than segment 4. Labium slender, apex of labium reaching apex of metacoxa. **Thorax:** Pronotum wider than long and anterior margin slightly sinuate. **Legs:** Claws of moderate length and stoutness and pulvilli of moderate size. **Hemelytra:** Slightly convex laterally, cuneus elongate tri-

angular. **Abdomen:** Stout, reaching to about middle of cuneus. **GENITALIA:** **Parameres:** Right paramere as in figure 7; left paramere (fig. 9) with anterior process of medium length and thickness, posterior process long, slender, bent ventrad, and truncate at apex, body with large, almost horizontal lobe, slightly bent to the left. **Phallosome** (fig. 11): External portion irregularly tubular, tapering toward apex, anterior surface basally with large horizontal flange and distinctly serrate lobe subapically, posterior surface with weakly serrate very shallow flange, opening ventral, slitlike at base and extended toward apex. **Vesica** (fig. 13): Large, with dorsal apical process blade-shaped and with exterior margin weakly serrate, proximal process square, large, median apical process tree-shaped with numerous branches, weakly sclerotized, ventral apical process long and slender, not connected to strap of vesical body.

*Female:* Coloration similar to male, somewhat more faded; shorter than male and slightly more ovoid body. Total length 3.12–3.50, length apex clypeus–cuneal fracture 2.10–2.28, width across pronotum 1.07–1.10.

**ETYMOLOGY:** Named for the type locality.

**HOST** (appendix 1): The single recorded host for this species is *Grevillea buxifolia* (Sm.) R.Br. (Proteaceae).

**DISTRIBUTION:** Known from Ku-Ring-Gai Chase and Royal National Parks close to Sydney, in New South Wales (fig. 17).

**DISCUSSION:** Closely related to *P. manilla* and the sister species *P. australianus* and *P. galbanus* according to the present analysis, based on the shape of the dorsal apical process of the male vesica.

**PARATYPES:** **AUSTRALIA:** **New South Wales:** Ku-Ring-Gai Chase National Park, McCarrs Creek, West Head Rd., 33.66668°S 151.25°E, 100 m, 14 Oct 1995, Schuh and Cassis, *Grevillea buxifolia* (Proteaceae), 2♂ (AMNH\_PBI 00132273, AMNH\_PBI 00132274), 2♀ (AMNH\_PBI 00132278, AMNH\_PBI 00132279) (AM). *Grevillea buxifolia* (Proteaceae), 13♂ (AMNH\_PBI 00132259–00132266, AMNH\_PBI 00132268–00132272), 19♀ (AMNH\_PBI 00132280–00132298) (AMNH). Royal National Park, Warumbul Road, 34.06667°S 151.0965°E, 111 m, 14 Nov 2001, Cassis, Schuh, Schwartz, Silveira,

*Grevillea buxifolia* (Sm.) R.Br. (Proteaceae), det. Field ID, 3♂ (AMNH\_PBI 00194494–00194496), 2♀ (AMNH\_PBI 00194520, AMNH\_PBI 00194521) (AM). *Grevillea buxifolia* (Sm.) R.Br. (Proteaceae), det. Field ID, 7♂ (AMNH\_PBI 00194497–00194503), 16♀ (AMNH\_PBI 00194504–00194519) (AMNH).

***Polyozus manilla***, new species  
figures 2, 7, 9, 11, 13, 17–20

**HOLOTYPE:** AUSTRALIA: New South Wales: 37 km W of Retreat (20 km E Manilla), 30.66668°S 150.8°E, 450 m, 24 Oct 1995, Schuh and Cassis, *Notelaea microcarpa* R.Br. (Oleaceae), det. K.D. Hill 1996 395921 H95-22, 1♂ (AMNH\_PBI 00087654) (AM).

**DIAGNOSIS:** Recognized by the small size, moderately elongate ovate body, pale green or brown general coloration, and characters of the male genitalia, most notably the small vesica with dorsal apical process bladelike, with serration on exterior surface and process of triangular shape, median apical process tree-shaped with numerous branches. Habitus similar to *P. australianus*, but distinguished by the different coloration, body shape, the left paramere stouter and shorter (in dorsal view) in that species.

**DESCRIPTION:** *Male:* Of moderate size, elongate ovoid, total length 3.02–3.43, length apex clypeus–cuneal fracture 1.91–2.05, width across pronotum 1.01–1.09. **COLORATION** (fig. 2): General coloration green, pale brown, pale orange, and orange. **Head:** Vertex and clypeus pale orange, sometimes vertex medially with pale area and base of clypeus brown, fasciae indistinct, mandibular and maxillary plates, gena and gula pale to sometimes vivid green. Antennal segments pale and gradually infusate toward apex, brown ring subbasally on segment 1. Labial segments pale, darker toward apex. **Thorax:** Pronotum green, calli and posterior lobe with yellow tinge and with more or less distinct pale median longitudinal line, mesonotum orange with paired green marks, scutellum green with pale apex. Pleura green with large parts of mesepisternum and metepisternum orange. **Legs:** Pale with tarsi infusate, fore and middle femora with small brown spots and hindfemur with larger brown spots, tibial spines dark with dark bases.

**Hemelytra:** Corium including cuneus usually pale brown with greenish tinge, sometimes brown, cuneus with large proximal clear area, membrane infusate, veins pale to orange, anterior cell distinctly infusate, with contrasting clear area anterior to cell and distal to corium. **Abdomen:** Pale green anteriorly, with gradually increasing yellow tinge toward pygophore. **SURFACE AND VESTITURE:** Dorsum shining, densely covered with moderately stout, subadpressed, dark, simple setae, and flattened, adpressed, silvery setae. **STRUCTURE: Head:** Short, vertex slightly wider than width of one eye, clypeus slightly produced, and maxillary plate sunken; eye large, as high as head. Antennal segment 1 moderately slender and slightly surpassing apex of head, segment 2 of moderate length and diameter, slightly smaller diameter than segment 1, diameter not increased toward apex, segments 3 and 4 slender, segment 3 longer than segment 4. Labium very slender, apex not reaching base of metacoxa. **Thorax:** Pronotum wider than long and anterior margin slightly sinuate. **Legs:** Claws of moderate length and stoutness and pulvilli of moderate size. **Hemelytra:** Hemelytra with costal margins subparallel, cuneus elongate triangular. **Abdomen:** Short and slender, just surpassing costal fracture. **GENITALIA:** **Parameres:** Right paramere as in figure 7; left paramere (fig. 9) with anterior process of medium length and thickness, posterior process long, slender, bent ventrad, and truncate at apex, body with distinct, almost horizontal lobe, slightly bent to the left. **Phallosheca** (fig. 11): External portion irregularly tubular, tapering toward apex, anterior surface basally with large horizontal flange and small serrate lobe subapically, posterior surface with weakly serrate small lobe, opening ventral, slitlike at base and extended toward apex. **Vesica** (fig. 13): Small, with dorsal apical process blade-shaped and with exterior margin indistinctly serrate, proximal process triangular, small, median apical process tree-shaped with numerous branches, weakly sclerotized, ventral apical process long and slender, not connected to strap of vesical body.

*Female:* Color pattern similar to male, slightly paler, shorter and more ovoid than male. Total length 2.91–3.12, length apex

clypeus–cuneal fracture 1.90–2.02, width across pronotum 1.02–1.10.

ETYMOLOGY: Named for the type locality.

HOST (appendix 1): Known from *Notelaea microcarpa* (Oleaceae). *Notelaea microcarpa* is distributed in the north-east of New South Wales, eastern Queensland, and the Arnhem Land region of the Northern Territory (AVH).

DISTRIBUTION: Known from two collecting events in northern New South Wales, located about 15 km apart (fig. 17).

DISCUSSION: The cladistic analysis gives evidence that this species is closely related to *P. kuringgai*, *P. australianus*, and *P. galbanus*. Both *P. australianus* and *P. galbanus* are restricted to *Acacia* spp. Future collecting will show whether *Notelaea* is a breeding host for *P. manilla* whose relatives appear to be restricted to *Acacia*.

PARATYPES: **AUSTRALIA: New South Wales:** 22 km W of Retreat (35 km E Manilla), 30.66668°S 150.8833°E, 600 m, 23 Oct 1995, Schuh and Cassis, *Notelaea microcarpa* R.Br. (Oleaceae), det. K.D. Hill 1996 NSW 395921, 14♂ (AMNH\_PBI 00132647–00132660), 15♀ (AMNH\_PBI 00132662–00132676) (AMNH). 37 km W of Retreat (20 km E Manilla), 30.66668°S 150.8°E, 450 m, 24 Oct 1995, Schuh and Cassis, *Notelaea microcarpa* R.Br. (Oleaceae), det. K.D. Hill 1996 395921 H95-22, 11♂ (AMNH\_PBI 00087653, AMNH\_PBI 00087655–00087664), 9♀ (AMNH\_PBI 00087665–00087673) (AM).

*Polyozus mina*, new species  
figures 2, 7, 9, 11, 13, 17–20

HOLOTYPE: **AUSTRALIA: South Australia:** Para Wirra National Park, 34.91668°S 138.9167°E, 350 m, 31 Oct 1995, Schuh, Cassis, and Gross, *Acacia paradoxa* DC. (Fabaceae), det. B.J. Conn 1996 NSW 395964, 1♂ (AMNH\_PBI 00131844) (AMNH).

DIAGNOSIS: Recognized by the small size, moderately elongate ovate body, uniformly yellowish green coloration, and characters of the male genitalia, most notably the vesica of moderate size, dorsal apical process slender, long, without serration, proximal process squarish and short, and median apical process consisting of several branches. Habitus most

similar to *P. kuringgai*, but distinguished by the smaller body size and smaller vesica. Male genitalia most similar to *P. galbanus*, but distinguished by vesica with median apical process with few branches and dorsal apical process without serration. Also distinguished from *P. galbanus* by the smaller size.

DESCRIPTION: **Male:** Of moderate size, elongate ovoid, total length 2.60–3.18, length apex clypeus–cuneal fracture 1.70–2.08, width across pronotum 0.97–1.04. **COLORATION** (fig. 2): General coloration rather uniformly brownish green with yellow tinge, mesonotum and apex of scutellum orange. **Head:** Uniformly brownish green with yellow tinge, fasciae present as pale dark marks, base of clypeus with dark mark. Antenna pale, with dark ring subbasally on segment 1, infusate toward apex. Labium pale, infusate toward apex. **Thorax:** Pronotum and scutellum uniformly brownish green with yellow tinge, mesonotum orange, scutellum with apex pale. Pleura pale greenish yellow with mesopleuron ventrally dark brown. **Legs:** Pale with tarsi infusate, fore and middle femora with scattered small brown spots and hindfemur more densely marked with large brown spots, tibial spines dark with dark bases. **Hemelytra:** Corium and cuneus rather uniformly brownish green with yellow tinge, proximal margin of cuneus with indistinct translucent area, membrane infusate with some clear patches, veins orange. **Abdomen:** Including dorsal surface of pygophore pale greenish yellow. **SURFACE AND VESTITURE:** Dorsum weakly shining, densely covered with semierect, simple, dark setae interspersed with flattened, subadpressed, silvery setae. **STRUCTURE:** **Head:** Short, vertex slightly wider than width of one eye, slightly produced clypeus, and sunken maxillary plate, eye large, but not quite reaching ventral margin of head. Antennal segment 1 moderately slender and slightly surpassing apex of head, segment 2 of moderate length and diameter, slightly smaller diameter than segment 1, diameter slightly increased toward apex, segments 3 and 4 missing in all observed specimens. Labium slender, reaching base of mesocoxa. **Thorax:** Pronotum wider than long and anterior margin slightly sinuate. **Legs:** Claws of moderate length and stoutness and pulvilli

of moderate size. *Hemelytra*: Slightly convex laterally, cuneus elongate triangular. Abdomen: Stout, reaching to about middle of cuneus. GENITALIA: Parameres: Right paramere as in figure 7; left paramere (fig. 9) with anterior process of moderate length and thickness, posterior process long, slender, slightly bent ventrad and anteriad, truncate at apex, body with large, straight, almost horizontal lobe. Phallosome (fig. 11): External portion irregularly tubular, tapering toward apex, anterior surface basally with large horizontal flange and subapically with distinct serrate lobe, posterior surface with notched and serrate small lobe, opening ventral, slitlike at base and extended toward apex. Vesica (fig. 13): Small, with dorsal apical process tubular, elongate, and with pointed apex, exterior margin smooth; proximal process squarish, large, median apical process tree-shaped with several branches, weakly sclerotized; ventral apical process long and slender, not connected to strap of vesical body.

*Female*: Coloration slightly paler than in male, body shorter and more ovoid than male. Total length 2.64–2.76, length apex clypeus–cuneal fracture 1.82–1.88, width across pronotum 0.90–1.09.

**ETYMOLOGY**: Named for the smooth surface of the dorsal apical blade, after the Latin adjective “minus, -a, -um”, meaning smooth or hairless.

**HOST** (appendix 1): Recorded from *Acacia paradoxa* (Fabaceae, Mimosoideae).

**DISTRIBUTION**: Known from one collecting site in southern South Australia (fig. 17).

**DISCUSSION**: The cladistic analysis presented here treats *P. mina* as the sister group to clade 14 (*P. kuringgai*, *P. manilla*, *P. australianus*, and *P. galbanus*).

**PARATYPES**: **AUSTRALIA: South Australia**: 7 km E Para Wirra National Park near Williamstown, 34.70001°S 138.85°E, 250 m, 31 Oct 1995, Schuh, Cassis, and Gross, *Acacia paradoxa* DC. (Fabaceae), det. B.J. Conn 1996 NSW 395964, 3 ♂ (AMNH\_PBI 00087711, AMNH\_PBI 00087713) (AM). Para Wirra National Park, 34.91668°S 138.9167°E, 350 m, 31 Oct 1995, Schuh, Cassis, and Gross, *Acacia paradoxa* DC. (Fabaceae), det. B.J. Conn 1996 NSW 395964 Host 95-65, 1 ♂ (AMNH\_PBI 00131839), 1 ♀ (AMNH\_PBI

00131850) (AM). *Acacia paradoxa* DC. (Fabaceae), det. B.J. Conn 1996 NSW 395964 Host 95-65, 5 ♂ (AMNH\_PBI 00131840–00131843, AMNH\_PBI 00131845), 2 ♀ (AMNH\_PBI 00131848, AMNH\_PBI 00131849) (AMNH).

***Polyozus tridens*, new species**  
figures 2, 7, 9, 11, 13, 17–20

**HOLOTYPE**: **AUSTRALIA: South Australia**: 8.8 km S of Oakbank, 33.11264°S 140.5524°E, 100 m, 08 Nov 1996, Schuh and Cassis, *Senna stowardii*? (S. Moore) B.R. Randell (Fabaceae, Caesalpinioideae), det. PERTH staff 05236541, 1 ♂ (AMNH\_PBI 00087403) (AM).

**DIAGNOSIS**: Recognized by the small size, elongate ovoid body, uniformly pale yellow coloration, and characters of the male genitalia, most notably the large vesica, with tubular dorsal apical process without proximal process, ventral apical process almost straight, not connected to strap of vesical body, and the well-sclerotized median apical process, consisting of one stem with two small teeth at about middle of process. Habitus and genitalia similar to *P. furcilla*, but distinguished by the structure of the vesica, with the median apical process with two teeth at about the middle in *P. tridens*.

**DESCRIPTION**: *Male*: Small and elongate ovoid, total length 2.47–2.77, length apex clypeus–cuneal fracture 1.58–1.78, width across pronotum 0.84–0.89. **COLORATION** (fig. 2): General coloration pale with yellow tinge, suffused with orange on pronotum, mesonotum, and scutellum. Head: Uniformly pale yellow, fasciae indistinct. Antennal segments pale and gradually infusate toward apex, with brown ring subbasally on segment 1. Labium pale, infusate toward apex. Thorax: Pronotum, mesonotum, and scutellum pale orange. Pleura pale yellow, partly suffused with orange. Legs: Uniformly pale with tarsi infusate, very small dark spots on femora, tibial spines dark with very small dark bases. *Hemelytra*: Corium and cuneus uniformly pale, membrane pale, veins yellowish. Abdomen: Pale green. **SURFACE AND VESTITURE**: Dorsum weakly shining, with moderately stout, subadpressed, dark, simple

setae, and flattened, adpressed, silvery setae. **STRUCTURE:** Head: Short, vertex slightly wider than width of one eye, clypeus slightly produced, and maxillary plate sunken, eye large, as high as head. Antennal segment 1 moderately slender and slightly surpassing apex of head, segment 2 of moderate length and diameter, of slightly smaller diameter than segment 1, segments 3 and 4 slender, segment 3 about as long as segment 4. Labium slender, apex of labium surpassing base of mesocoxa. Thorax: Pronotum wider than long and anterior margin slightly sinuate. Legs: Claws slender and of moderate length, and pulvilli of moderate size. Hemelytra: Hemelytra slightly convex laterally, cuneus elongate triangular. Abdomen: Stout, reaching to about middle of cuneus. **GENITALIA:** Parameres: Right paramere as in figure 7; left paramere (fig. 9) with short and slender anterior process, posterior process long, slender, bent ventrad, and slightly truncate at apex, body with large, straight, almost horizontal lobe. Phallosome (fig. 11): External portion irregularly tubular, only slightly tapering toward truncate apex, anterior surface basally with large horizontal flange, opening ventral, slitlike at base and extended toward apex. Vesica (fig. 13): Large, with tubular dorsal apical process without proximal process; ventral apical process almost straight, not connected to strap of vesical body; median apical process well sclerotized, consisting of one stem with two small teeth at about middle of process.

**Female:** Coloration similar to male, size about same as in male. Total length 2.30–2.50, length apex clypeus–cuneal fracture 1.57–1.74, width across pronotum 0.83–0.97.

**ETYMOLOGY:** Named for the shape of the median apical process of the vesica, after Latin adjective “tridens, -entis”, meaning having three teeth or prongs.

**HOST** (appendix 1): The only known host was recorded as *Senna*, probably *Senna stowardii* (Fabaceae, Caesalpinioideae).

**DISTRIBUTION:** Known from one locality near Oakbank, South Australia (fig. 17).

**DISCUSSION:** This species is close to *P. furcilla*, but it is distinguished by the shape of the median apical process of the vesica.

**PARATYPES:** **AUSTRALIA:** **South Australia:** 8.8 km S of Oakbank, 33.11264°S

140.5524°E, 100 m, 08 Nov 1996, Schuh and Cassis, *Senna stowardii?* (S. Moore) B.R. Randell (Fabaceae), det. PERTH staff 05236541, 1♂ (AMNH\_PBI 00087646), 6♀ (AMNH\_PBI 00087404, AMNH\_PBI 00087647–00087651) (AM).

#### CLADISTIC ANALYSIS OF THE *POLYOZUS* GROUP OF PHYLINI, WITH REMARKS ON HOST PLANT ASSOCIATIONS AND DISTRIBUTIONS

The cladistic analysis of the 16 ingroup taxa in NONA resulted in eight equally most parsimonious trees (L = 91; CI = 67; RI = 83). The strict consensus of these trees is shown in fig. 18. The analysis with implied weights using Pee-Wee resulted in two trees (with a fit of 373.3; L = 92; CI = 66; RI = 82), the strict consensus of which is shown in figure 19. The two trees obtained using Pee-Wee did not correspond to either of the eight trees recovered in the NONA analysis. However, overall topologies of the two analyses are very similar (figs. 18, 19). The main difference in topology between the two analyses is the placement of *Ancoraphylus carolus* either as sister group to the remaining species of that genus (unweighted tree) or as the sister group to *A. arctous* + *A. mariala* (node 6 vs. 6a in figs. 18 and 19). In addition, clade 9 (i.e., monophyly of the *Polyozus* species excluding *P. bulita*) is not supported in the weighted analysis.

Character optimizations are discussed together with the character descriptions in table 2. The discussion is based on the strict consensus obtained through the unweighted analysis (fig. 18). Clades (figs. 18, 19) with some of their synapomorphies are summarized briefly in the following paragraphs. Unless stated otherwise, unambiguous optimizations are used for the discussion of character distributions.

The *Polyozus* group (fig. 18; clade 1) is well supported in the present analysis. Among the synapomorphies are a short labium, combination of simple/suberect and flattened/subadpressed setation (fig. 4), J-shaped vesica with process arising close to secondary gonopore, the dorsal apical process bent at a right angle, which renders the apex of the vesica virtually

anchor-shaped (figs. 12, 13), and characters of the female genitalia (fig. 14).

Using fast optimization, synapomorphies of *Exocarpocoris* (clade 2) are: the flattened shape of the vesical process arising close to the secondary gonopore, the long and coiled shape of this process (fig. 12), the dark U-shaped mark on the hemelytron, and the white color of the cuneus (fig. 1). Within *Exocarpocoris*, *E. aurum* and *E. tantulus* are supported as sister species (clade 3) due to wide vertex and small eyes (fig. 1) and the wide pronotum (fig. 1), but also due to the large left paramere and the horizontal, lobe-like extension of the body of the paramere (fig. 8).

The sister group relationship between *Ancoraphylus* and *Polyozus* (clade 4) is supported by (unambiguous optimization) the irregular shape of the phallosome including the basal flange or spine, the orientation of the ventral apical process of the vesica at almost a right angle to the body of the vesica, and the heavy dark punctation of the femora.

The species of *Ancoraphylus* are united in clade 5 by the type of flattened setae (with parallel rather than oblique ridges as in the other taxa of the *Polyozus* group; fig. 4), the tubercle on the pygophore (fig. 6A), and the elongate horizontal lobe of the left paramere (fig. 8). In fast optimization, the dorsal process on the lateral or posterior margin of the left paramere is added to these characters (fig. 8). The position of *A. auski* and *A. carolus* relative to each other is ambiguous (fig. 18, node 6 and fig. 19, node 6a). The sister species relationship of *A. arctous* and *A. mariala* is well supported, with the greatly enlarged right paramere (fig. 7) and the appendages on the ventral and dorsal apical processes of the vesica among the synapomorphic characters (fig. 12).

Among the apomorphic characters of the genus *Polyozus* (figs. 18, 19, clade 8) are the large eyes (fig. 2), the notched apex of the right paramere (fig. 7), the short and usually straight process arising close to the secondary gonopore of the vesica (figs. 12, 13), and the characteristic tree-shaped or forked median apical process of the vesica (figs. 12, 13).

A sister group relationship of *P. bulita* with the remaining species (clade 9) is only resolved

in the unweighted analysis. It results from the simple phallosome in *P. bulita* (fig. 11) and the fact that all other species have at least a smooth lobe in a subapical position on the phallosome. Clade 10 (*P. furcilla*, *P. kojonup*, and *P. tridens*) is recovered in both analyses, but a sister group relationship of *P. furcilla* and *P. tridens* is only supported in the weighted analysis. *Polyozus mina* shares a serrate subapical lobe on the anterior surface of the phallosome and an additional lobe on the posterior surface with the other species of clade 10 (fig. 11). Clade 12 (*P. kurringai*, *P. manilla*, *P. australianus*, and *P. galbanus*) is supported by the shape of the dorsal apical process, which is fan-shaped and distinctly serrate (figs. 12, 13).

**HOST PLANT ASSOCIATIONS:** Unambiguous optimization of host plants on the present analysis of the *Polyozus* group fails to identify the host plant of the last common ancestor of the entire clade, but fast optimization (fig. 20) treats *Acacia* as the ancestral host plant.

The genus *Exocarpocoris* is restricted to *Exocarpos aphyllus*, pointing to a host switch to that plant and subsequent evolution of this clade on *E. aphyllus*. Based on available evidence (i.e., cladistic analysis and host plant records), the speciation event that gave rise to the sister species *E. aurum* and *E. tantulus* has taken place on *E. aphyllus*.

Host plant distribution using fast optimization on the tree (fig. 20) indicates further that the sister groups *Ancoraphylus* and *Polyozus* evolved on *Acacia* (Fabaceae, Mimosoideae), and that within the genus *Polyozus* species switched to other groups of hosts. The host plant of *A. arctous* is unknown, but judging from host associations of related taxa and cladistic analysis, it is most likely *Acacia*. The same prediction could be made for *Polyozus bulita*, which was so far only collected at light. Within clade 11 of the genus *Polyozus*, the sister species *P. australianus* and *P. galbanus*, both with numerous host records, and *P. mina* are recorded from species of *Acacia*. *Polyozus furcilla* and *tridens* are recorded from *Senna* (Fabaceae, Caesalpinioideae), and *Polyozus kojonup* occurs on *Jacksonia* (Fabaceae, Papilionoideae). Although not in the same subfamily, *Senna* and *Jacksonia* belong to the same plant family as *Acacia*, a fact that might

facilitate host switching. The host switches that appear to have occurred in *P. kuringgai* (to *Grevillea*, Proteaceae) and *P. manilla* (to *Notelaea*, Oleaceae) in contrast have crossed family boarders.

DISTRIBUTION OF SPECIES OF THE *POLYOZUS* GROUP (figs. 15–17): Even though *Polyozus galbanus* was described from New Zealand, the present study provides evidence that *P. galbanus*, but also other species of this genus and related genera, are of Australian origin (see discussion of *P. galbanus*). The species of *Polyozus* are mostly distributed in the south-east, south, and west of Australia, with the exception of *P. bulita*, which appears to be restricted to the dry interior of the continent. Due to the limited number of records for most species of the *Polyozus* group, the range of distribution for most species is poorly known. Some species may be relatively restricted. A notable exception is *P. australianus*, which extends from the Australian Capital Territory in the east to southern Western Australia.

Compared to *Polyozus*, the species of *Ancoraphylus* are more northern and occur mostly in the dry interior of the continent.

The distribution of *Exocarpocoris* species resembles generally that of *Polyozus* spp. in being restricted to areas close to the coast. The wide distribution of both *E. aurum* and *E. tantulus* from South Australia to Western Australia (in the case of *E. tantulus* even up to the Shark Bay area) is noteworthy.

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## APPENDIX 1

HOST PLANT RECORDS OF SPECIES OF  
*ANCORAPHYLUS*, *EXOCARPOCORIS*, AND *POLYOZUS**Ancoraphylus auski**Acacia* cf. *brachystachya* Benth. (Fabaceae, Mimosoideae): 6 specimens

Australia: Northern Territory, 184 km E of Stuart Highway on Lasseter Highway

*Ancoraphylus carolus**Acacia aneura* var. *latifolia* F. Muell. ex Benth. (Fabaceae, Mimosoideae): 8 specimens

Australia: Queensland, 14.2 km E of Charleville

*Ancoraphylus mariala**Acacia stowardii* Maiden (Fabaceae, Mimosoideae): 21 specimens

Australia: Queensland, 143 km WNW of Charleville, Mariala National Park

Australia: Queensland, 146 km NW of Quilpie

*Exocarpocoris aurum**Melaleuca uncinata* (Myrtaceae): 17 specimens

Australia: Western Australia, 55.6 km SE of Southern Cross

*Exocarpos* sp. (Santalaceae): 15 specimens

Australia: Western Australia, Eneabba on Brand Highway

*Exocarpos aphyllus* (Santalaceae): 319 specimens

Australia: South Australia, 20 km W of Nepabunna, Mt. Serle

Australia: South Australia, 41.5 km NW of Morgan

Australia: South Australia, 5 km SW of Whyalla

Australia: South Australia, 75 km NW of Morgan, 5 km N of Cane Grass

Australia: South Australia, 8.8 km S of Oakbank

Australia: South Australia, 96 km NW of Morgan, Pine Valley Stn

Australia: South Australia, Mt Serle district (near Gammon Ranges National Park)

Australia: Victoria, Murray Sunset National Park, Lost Hope Track

Australia: Western Australia, ca. 35 km S of Menzies

Australia: Western Australia, Moorine Rocks, 11.7 km N of Great Eastern Highway on Noongar Road

*Exocarpocoris praeagrailis**Melaleuca uncinata* (Myrtaceae): 1 specimen

Australia: Western Australia, 55.6 km SE of Southern Cross

*Exocarpos aphyllus* (Santalaceae): 4 specimens

Australia: Western Australia, ca. 35 km S of Menzies

Australia: Western Australia, Moorine Rocks, 11.7 km N of Great Eastern Highway on Noongar Road

*Exocarpocoris tantulus**Exocarpos* sp. (Santalaceae): 11 specimens

Australia: South Australia, 8.8 km S of Oakbank

Australia: Western Australia, Exmouth (waste area behind sand-dune), Truscott Crescent (opposite Pony Club)

*Exocarpos aphyllus* (Santalaceae): 146 specimens

Australia: South Australia, 20 km W of Nepabunna, Mt. Serle

Australia: South Australia, 41.5 km NW of Morgan

Australia: South Australia, 75 km NW of Morgan, 5 km N of Cane Grass

Australia: South Australia, 8.8 km S of Oakbank

Australia: South Australia, 96 km NW of Morgan, Pine Valley Stn

Australia: Victoria, Murray Sunset National Park, Lost Hope Track

Australia: Western Australia, 11 km N of Coolgardie-Esperance Highway on Kambalda Road

Australia: Western Australia, 24 km SE of jct of Manga Rd and Shark Bay Rd, Shark Bay World Heritage Area

Australia: Western Australia, 43 km N of Norseman

Australia: Western Australia, 89.2 km N of jct of Agana Kilabarra Rd and Brand Highway, on Brand Highway

Australia: Western Australia, ca. 35 km S of Menzies

Australia: Western Australia, Moorine Rocks, 11.7 km N of Great Eastern Highway on Noongar Road

*Polyozus australianus**Acacia baileyana* (Fabaceae, Mimosoideae): 91 specimens

Australia: Tasmania, Kingston, Welcome Inn grounds just E of A6

*Acacia decurrens* (Fabaceae, Mimosoideae): 12 specimens

Australia: Australian Capital Territory, Black Mountain

*Acacia* sp. (Mimosoideae): 57 specimens

Australia: Australian Capital Territory, Ginninderra

Australia: Western Australia, Kevill Road, 4 km W of Margaret River

*Polyozus furcilla**Senna glutinosa* (Fabaceae, Caesalpinioideae): 19 specimens

Australia: South Australia, 5 km SW of Whyalla

*Senna artemisioides* ssp. ;its *coriacea* (Fabaceae, Caesalpinioideae): 13 specimens

Australia: South Australia, 75 km NW of Morgan, 5 km N of Cane Grass

***Senna form taxon 'coriacea' (Fabaceae, Caesalpinoideae): 96 specimens***

Australia: South Australia, 14.3 km S of Erudina Woolshed

***Eremophila sturtii* (Myoporaceae): 3 specimens**

Australia: South Australia, 14.3 km S of Erudina Woolshed

***Polyozus galbanus***

***Acacia baileyana* (Fabaceae, Mimosoideae): 3 specimens**

Australia: Tasmania, Kingston, Welcome Inn grounds just E of A6

***Acacia dealbata* (Fabaceae, Mimosoideae): 7 specimens**

Australia: Tasmania, 7 km W of Southwest National Park (Maydena access): intersection of Frodsham's Pass and Gordon River Rd

***Acacia dealbata* [*Racosperma dealbatum*] (Fabaceae): 2 specimens**

New Zealand: Christchurch

***Acacia dealbata* ssp. *dealbata* (Fabaceae, Mimosoideae): 114 specimens**

Australia: Tasmania, Avoca Picnic Area, just NW of A4

Australia: Tasmania, Kingston, Welcome Inn grounds just E of A6

Australia: Tasmania, Mt. Field National Park, Russell Falls Visitor Centre

***Acacia mearnsii* (Fabaceae, Mimosoideae): 39 specimens**

Australia: New South Wales, 17 km N of Bega

Australia: New South Wales, 65 km N of Sydney on Pacific Highway

Australia: New South Wales, Araluen

Australia: New South Wales, Bournda National Park, North Wallagoot, Turingal Head

Australia: South Australia, 1 km S of Riverton

***Acacia* sp. [as *Racosperma* sp.] (Fabaceae, Mimosoideae): 1 specimen**

New Zealand: Kowhai Bush

***Eremophila sturtii* (Myoporaceae): 1 specimen**

Australia: South Australia, 14.3 km S of Erudina Woolshed

***Senna form taxon 'petiolaris' (Fabaceae): 2 specimens***

Australia: South Australia, 14.3 km S of Erudina Woolshed

***Polyozus kojonup***

***Jacksonia cupulifera* (Fabaceae, Papilionoideae): 23 specimens**

Australia: Western Australia, 15 km NW of Northampton, on Port Gregory Rd (toward Gregory)

***Jacksonia horrida* (Fabaceae, Papilionoideae): 6 specimens**

Australia: Western Australia, Leeuwin Naturaliste National Park, Canal Rocks

***Jacksonia sternbergiana* (Fabaceae, Papilionoideae): 35 specimens**

Australia: Western Australia, 3 km S of Kojonup, Sampson Road

***Polyozus kurringai***

***Grevillea buxifolia* (Proteaceae): 65 specimens**

Australia: New South Wales, Ku-Ring-Gai Chase National Park, McCarrs Creek, West Head Rd.

Australia: New South Wales, Royal National Park, Warumbul Road

***Polyozus manilla***

***Notelaea microcarpa* (Oleaceae): 21 specimens**

Australia: New South Wales, 37 km W of Retreat (20 km E Manilla)

***Notelaea microcarpa* (Oleaceae): 29 specimens**

Australia: New South Wales, 22 km W of Retreat (35 km E Manilla)

***Polyozus mina***

***Acacia paradoxa* (Fabaceae, Mimosoideae): 13 specimens**

Australia: South Australia, 7 km E Para Wirra National Park near Williamstown

Australia: South Australia, Para Wirra National Park

***Polyozus tridens***

***Senna stowardii?* (Fabaceae, Caesalpinoideae): 8 specimens**

Australia: South Australia, 8.8 km S of Oakbank







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