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A NEW SPECIES OF *STRYMON* HUEBNER FROM GEORGIA (LEPIDOPTERA, LYCAENIDAE)

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Although the eastern part of the United States has been well combed for butterflies during the past 175 years, it is not altogether unexpected that an occasional, previously overlooked species should be found. During recent years *Incisalia lanoraeensis* Sheppard, *Strymon caryaevorus* McDunnough, and *Mitoura hesseli* Rawson and Ziegler have thus been named. Now we are pleased to be able to add another, significantly also a hairstreak. Moreover this species is a native of the parts of Georgia where that pioneer collector, John Abbot, collected and reared butterflies so assiduously during the late eighteenth century. In fact, Abbot may conceivably have collected specimens of it, although of this we have no evidence; but it is not surprising, when we contrast the taxonomic criteria and methods of his day with those of our own, that it has remained unrecognized.

Some time ago Mr. H. L. King of Sarasota, Florida, sent separately to the authors specimens of what appeared to be a new member of the *calanus* group of the genus *Strymon* Huebner, as well as other material of nearly equal interest. This material was taken by him near Savannah, Georgia. In subsequent years Mr. King has added to this material. Other collectors have generously lent material of this group, and among this, additional specimens of the new species were found. These discoveries have prompted a more extensive investigation of the whole group, but

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since work on this is still in progress and promises to be long in its completion, it seems advisable to present the new species at once, reserving discussion of the other material until a later time.

It gives us great pleasure to name this new hairstreak for its discoverer in recognition not only of his capture of it but also of his outstanding ability as a collector and field observer.

Strymon kingi, new species

HEAD AND BODY

Eyes hairy, bordered medially and posteriorly with white; frons black, the hairs rather short and erect; vertex with a small patch of white hair between the bases of the antennae; collar dorsally of black-brown, long, forward-directed hair, merging laterally with the ventral hair, very long and pale tan and bluish in color; palpi directed forward and upward, the termini on a level with the middle of the eye, black-brown, overlain and intermixed with bluish white scales, the latter predominating ventrally; antennae reaching about three-fifths out along the costa of the forewing, with 18 to 19 white annulations visible from above, and a rather abruptly swollen club; this is dorsally dark, black-brown, ventrally somewhat paler, its tip (approximately the terminal quarter of the club) above and below bright fulvous. Thorax above covered with black-brown, greenish iridescent hairs, absent (rubbed?) on the dorsum, longest lateroposteriorly and posteriorly, forming the long, anally directed tuft rather characteristic of many lycaenids; ventrally with long bluish gray hairs; legs blue-white with black annuli at the bases of the first four tarsal segments, subapically and medially on the tibia and on the whole of the femur, in every case on the outer face only, the inner flank of the legs being uniformly white; femora with a long, posterior fringe of hair scales. Abdomen above black-brown, below whitish.

WINGS

MALE (UPPER SIDE; FIG. 2A): Both wings black-brown, faintly coppery to greenish iridescent except for a rather narrow and poorly defined marginal border on both wings. In one paratype there are a few scattered fulvous scales in the disc of the forewing. Forewing with a scent pad (stigma) at the anterodistal edge of the discal cell, two-thirds of its length basad, one-third marginad of the closing vein of the cell (*mdc*, middle discocellular).

Its maximum width (costo-anal dimension at *mdc*) is about that of the base of cell M_1 , and it is about two and a half to four times as long. In shape it is elongate ovoid, often pointed distad (along vein M_1) and basad (along vein R_{2-5}). Very brief, pointed extensions are also present along the other veins that pass beneath it (*mdc*, R_{3-5} , edge of R_2). In addition there is, on the extreme bases of M_3 and Cu_1 , on the vein that connects these two, and slightly basad of the base of Cu_1 on *m-cu*, a supplementary, linear patch of androconial scales. Hind wing with the outer margin distally displaced in cell Cu_1 (relative to that costad of Cu_1) and slightly more so again in cell Cu_2 , giving a distinct distal "jog" to the margin at veins Cu_1 and Cu_2 . Costal area slightly paler than the rest of the wing. In cell Cu_1 is an ill-defined but clearly visible, dark, nearly black, submarginal spot, and in cell Cu_2 a similar one, rather larger. Distad of the latter is a faint, slender, blue-white marginal line, traversing the interspace from one vein to the other. Anal lobe black, basally edged with white on the inner margin.

Fringe of forewing black-brown. That of hind wing similar, but from Cu_1 to anal angle basally pallid, distally dark. At 2A is a white tuft, not exceeding the rest of the fringe in length. Tail at Cu_1 very short; that at Cu_2 of moderate length, slightly exceeding the marginal width of cell Cu_1 . Both are black, tipped with long, pure white scales. The tails at Cu_2 are edged with pure white scales. At the base this edge is on the anal side of each tail. But the tails are sharply twisted at their bases so that in each case the anal edge (with the white scaling) passes across ventrally to lie away from the anal side of the tail. The twisting then continues a spiral so as to bring the white edge back across, dorsally, to the anal side again. This is not so noticeable as in the longer tails of the females. This twisting is a constant, regular, and natural feature which must be studied with care and not confused with the irregular, artificially produced twists or bends that may be seen on many specimens of some other hairstreaks.

MALE (UNDER SIDE; FIGS. 2C, 2E, 2F, 3A): Both wings slightly purplish brown, the forewing slightly iridescent gray on the inner margin over a crescentiform area extending inward to a vaguely delimited curved edge from the end of Cu_2 on the outer margin, inward to the middle of cell Cu_1 just below the origin of vein Cu_1 , thence to the discal cell vein and down to the wing base. Along this line this gray shades almost imperceptibly into the ground color, though in the base of cell Cu_1 it has a tendency to darken.

Basal area of the forewing and baso-anal area of the hind wing very faintly olive green iridescent.

Forewing with costa at base very narrowly pale tan. The end of the cell is closed by a faint double white bar, not transgressing on the scent pad area (which is here visible as a raised region). The scales within this bar are slightly darker than those of the surrounding ground color.

A post-discal line of dashes crosses from R_2 or R_{3-5} to $2A$, the individual dashes being mostly outwardly slightly convex and inwardly edged narrowly with poorly defined brown or black-brown. In three specimens there is evident, still farther basad but contiguous with the black-brown, a fulvous edging as well; and in all specimens the outer white dashes are more or less duplicated basad, making a set of double dashes, although in two of the specimens this basal white edge is obsolescent and represented by only a few scales. This is somewhat after the fashion of *Strymon liparops* (fig. 3C, 3D) although the inner set is fainter than the outer, and the distance between them considerably less than in that species. This row of dashes is much dislocated. Relative in each case to its costad neighbor, this dislocation may be described as follows: (1) distad for the pair in cells M_1 and M_2 (that in cell R_{3-5} being approximately three-quarters of the base-to-apex distance out from the base); (2) strongly basad for that in cell M_3 ; (3) very slightly or not at all basad for that in cell Cu_1 ; (4) strongly basad for that in cell Cu_2 , the outer part of this latter being, in three of the five specimens, in line with the outer part of the dash at the end of the cell. The dash in cell Cu_2 is somewhat fainter than the others, and its anal half is often very faint or even altogether obscured.

Distad of this row of dashes is a submarginal line, continuous except for interruptions at the veins and subparallel to the outer margin, but slightly diverging from it towards the inner margin. It is composed of a slender, black line, usually basally shaded by a narrower edging of white or blue-white scales, rather sparse, and marginally bordered faintly with fulvous. This line is strongest (as described above) between M_3 and Cu_2 and obsolesces strongly both costad and anad. Distad of this line is a poorly defined band, very slightly darker than the ground color, and at the outer margin is a slender, unbroken, dark brown line, not very sharply defined. In the M_1 to M_3 area the submarginal line is sometimes

about midway between the post-discal line and the outer margin, sometimes rather closer to the latter.

Hind wing: cell closed by a long, duplex dash, with dark brown immediately interior to the whitish edges and ground color occupying the remaining space within. A post-discal series of dashes crosses the wing, from Sc to the inner margin, homologous to the series on the forewing, but differing from it as follows: the dashes tend to be more separate from each other, and thus to appear more like separate, oval spots; the tendency to duplexity is greater; the fulvous is less evident; and the pattern of dislocation is different. This dislocation is as follows: (1) the dash in cell Sc is about three-quarters out on costa; (2) that in cell Rs is distad of this; (3) that in cell M_1 is still more distad; (4) that in cell M_2 is in line with that in cell M_1 or slightly distad; (5) that in cell M_3 is basad and somewhat diagonal (its anal end more distal); (6) that in cell Cu_1 is distad of that in cell M_3 and similarly diagonal, so that the two are about in line with each other; (7) that in cell Cu_2 is likewise diagonal to the margin in its cell, but more strongly so, thus making a pronounced break here in the line of dashes; in one specimen this dash is represented by only the merest trace, and in most specimens the costal end tends to obsolescence; (8) that in cell 2A is elongate, sharply diagonal, anad and basad (with respect to the outer margin in its cell), being thus almost parallel to the inner margin. The above-described dislocation is apparently the result of a tendency for the line of dashes to remain roughly parallel to the outer margin, in which it succeeds quite well.

Distad of this line of dashes there is, as in the forewing, a submarginal line. From M_3 costad it is very similar to that of the forewing, so that the description need not be repeated. Thence basad it is rather different: (1) the black is heavier; (2) the segments are distally concave; (3) its course is no longer parallel to the outer margin, but deviates progressively basad to 2A; (4) anad of this it is sharply dislocated distad, lying close to the margin; (5) in cell M_3 the fulvous is brighter and thicker, forming a slender crescent; (6) in cell Cu_1 this is thicker still, forming a pronounced, bright reddish fulvous crescent which dominates the pattern of the under surface; (7) in cell Cu_2 the fulvous is again thin, forming a basal cap for the large, bluish, quadrate spot immediately marginad of it; and (8) in cell 2A the fulvous forms a thin, submarginal line, thicker towards vein 2A, tapering anad.

The band of darker scales distad of this line on the forewing is present and similar on the hind wing except as follows: (1) in cell Cu_1 it is greatly thickened, forming a prominent, oval or lenticular black spot just distad of the dominant fulvous crescent; the black area may be nearly as thick (lengthwise of the veins) as the fulvous; (2) in cell Cu_2 it is much thicker still, filling the interspace in breadth, and slightly deeper than broad, the black heavily dusted with iridescent bluish scales, forming the quadrate, bluish spot mentioned above; (3) anad of 2A this band is not clearly apparent, although possibly the jet black anal lobe is a part of it.

This anal lobe is jet black, basally capped with white; basad of it along the anal margin are a diagonal fulvous streak, a very thin black line, and an equally thin white line; these are all apparently homologs of the elements of the submarginal line and those distal to it.

Distad of the last band described is a thin, white thread line, following intimately the sinuosity of the outer margin. It is most pronounced from 2A to about M2 and thence to the costa becomes progressively fainter to final complete obsolescence at or near the costa. Contiguous to, and distad of, this line is a thin, dark brown marginal line, becoming obsolescent costad.

Fringe and tails as on the upper side.

FEMALE (UPPER SIDE; FIG. 2B): As in the male, with the following differences. Scent pad and secondary androconial area are absent. Outer margin of forewing more convex; the apical area of this wing less produced; anal area of hind wing less produced, the margin between Cu_1 and 2A being continuous (lacking the Cu_2 dislocation of the male, though that at Cu_1 is present); the effect of the foregoing is a more quadrate over-all aspect of the female, as compared with the rather trapezoidal outline of the male. The color of the upper surface lacks any iridescence and is on the forewing marginally blackish brown, discally and basally slightly paler, faintly tinged with yellowish or fulvous. This color differentiation of the forewing is not visible in worn specimens. On the hind wing the anal black spots are larger and more prominent, owing apparently to a slightly paler ground color than in the male.

FEMALE (UNDER SIDE; FIG. 2D): Ground color lighter, more gray-brown and (in fresh specimens) with a more distinct purplish sheen. Transverse markings more distinct. In particular, those of the post-discal row are more consistently duplex (i.e., edged

basally with white). On the hind wing only one specimen lacks this basal white edging of the dashes in cells M_1 , M_2 , M_3 , Cu_1 , and Cu_2 . The tendency of the dash in cell Cu_2 of the hind wing to costal obsolescence is not so marked as in the male.

Tails consistently longer than in the males. Since experience has shown us that there may be marked local variation in this character, we compare only the actual Savannah type material. In these, four males in suitable condition show a ratio of length of the Cu_2 tail to the distance between the tips of Cu_1 and Cu_2 of 1.33/1. The two females, similarly measured, show a ratio of 2.09/1, indicative of the greater proportionate length of their tails. The tail at Cu_1 is even more markedly longer than in males. The five males in the type series show a ratio of length of this tail to distance between apices of veins Cu_1 and Cu_2 of 0.37 (average of the five ratios), whereas in the two females of the type series the ratio averages 1.15. Roughly, then, this tail is about three times as long in the female as in the male.

SIZE

Length of forewing, from base to apex, of holotype and four male paratypes: 13.6 mm., 15.8 mm., 16.0 mm., 16.4 mm., and 17.0 mm.; mean, 15.76 mm.

Length of forewing from base to outer margin, parallel to inner margin, of holotype and four male paratypes: 11.5 mm., 12.4 mm., 12.8 mm., 13.0 mm., and 13.7 mm.; mean, 12.7 mm. This measurement is employed to facilitate comparison with wing expanse measurements often given; it is less subject than they to the errors that a variably compressible body may introduce.

Length of forewing from base to apex of allotype and one female paratype: 15.2 mm., 15.6 mm.; mean, 15.4 mm.

Length of forewing from base to outer margin, parallel to inner margin, of allotype and one female paratype: 13.0 mm., 13.2 mm.; mean, 13.1 mm.

TYPE MATERIAL

Holotype, male, Savannah, Georgia, May 16, 1949, collected by H. L. King. Allotype, female, Savannah, Georgia, May 24, 1951, collected by H. L. King. Four male paratypes, Savannah, Georgia, collected by H. L. King: No. 1, May 24, 1951; Nos. 2, 3, May 20, 1949; No. 4, May 20, 1950. One female paratype, Savannah, Georgia, May 24, 1951, collected by H. L. King.

The holotype and allotype are in the American Museum of Natural History. Male paratype No. 1 is in the Carnegie Museum. Male paratype No. 2 is in the collection of the junior author. Male paratypes Nos. 3 and 4 and the female paratype are in the collection of H. L. King.

OTHER MATERIAL

In addition to the type material we have before us five specimens of *kingi* which we do not feel warranted in including as part of the type series, although their identification is indubitable. These are: one male, badly worn, Conestee Falls, near Brevard, North Carolina, August 8-14, Carnegie Museum Accession No. 12938, collected by W. R. Sweadner; one female, badly worn, Sipsey, Walker County, Alabama, July 10, 1949, collected by R. L. Chermock; three females, somewhat worn, Helen, White County, Georgia, July 25, 1951, collected by Robin Harris (fig. 3B).

These specimens are excluded from the type series of the species *S. kingi* because of the danger of future subspecies confusion. The male is quite large (forewing, base of costa to apex, 17.0 mm.) and quite dark. The Alabama female is small (forewing, base of costa to apex, 14.4 mm.) and quite pale. The three Helen, Georgia, females are large (forewing, base of costa to apex, 15.8, 16.0, and 16.2 mm.) and have proportionately very short tails. The tails of the other specimens are too worn for accurate measurement. Since in related hairstreaks the tails of northern (and mountain) populations quite consistently average much shorter than those of more southern ones, there is the likelihood that at least the Helen, Georgia, specimens represent a more or less different, perhaps subspecifically distinct population.

The Alabama female is in the collection of Dr. R. L. Chermock of the University of Alabama. One of the Helen, Georgia, females is in the American Museum of Natural History; the other two are in the collection of Mr. Lucien Harris of Avondale Estates, Georgia. The North Carolina male is in the Carnegie Museum.

COMPARISON WITH OTHER *Strymon* (FIG. 3C-3F)

The closest relative of *S. kingi* appears to be the sympatric but much more widespread *S. liparops*¹ Boisduval and LeConte, yet it

¹ We use this name for the species referred to as *S. strigosus* (Harris) by Michener and dos Passos (1942, p. 2), in view both of a subsequent paper by Forbes (1943) and also of specimens collected by King flying with *kingi* and now being studied by us. There appears to be no further doubt of the existence and identity of *S. liparops* or of the specific identity with it of *S. strigosus* (Harris), *aliparops* Michener and dos Passos, and *fletcheri* Michener and dos Passos.

bears a greater superficial resemblance to *S. falacer* Godart and even, in some ways, to *S. caryaevorus* McDunnough. In view of this, detailed comparisons are made with these other species.

The scent pad or stigma of the forewing of the male is smaller than in either *falacer* or *liparops*. It resembles that of the latter in having definite, pointed extensions along the veins; these are absent or but slightly developed in *falacer*. *S. kingi* also possesses a linear, supplemental androconial area along and between the bases of veins M_3 and Cu_1 (at the lower, distal angle of the discal cell) similar to one found in *liparops*. This supplemental androconial area is lacking in *falacer*, *edwardsii* Grote and Robinson, *caryaevorus* McDunnough, and other related forms.

On the hind wing, the distal displacement of the outer margin in cell Cu_1 , which it shares with *liparops*, is somewhat less pronounced or lacking in *falacer*. The further distal displacement of the margin in cell Cu_2 is largely peculiar to *kingi*, although indications of it may be found in some specimens of both *liparops* and *falacer*. The tails are somewhat shorter than those of *falacer* from the same locality (where they average longer than from more northern or mountainous regions) and are probably still shorter than those of *liparops* from the same locality. The distinct and constant twisting¹ of the Cu_2 (the longer) tails is as in *liparops*, whereas in *falacer* and its relatives (*calanus*, *caryaevorus*, *edwardsii*) this tail appears to be normally not twisted.

The nearly uniform, dark brown upper surface distinguishes *kingi* at once from *S. liparops liparops*, which flies with it, for the latter consistently has a large, fulvous patch on each forewing, and from such other *liparops* subspecies as *aliparops* and *fletcheri* (it may be noted that even some specimens of *S. liparops strigosus* show a greater or lesser amount of this discal fulvous on the forewing). In this, *kingi* bears a superficial resemblance to *falacer*, although its faint bronzy, greenish iridescence is peculiar to itself. The vague, dark anal spots on the hind wing are similar to those of *liparops* and more pronounced than those of *falacer*. There is in the specimens at hand no tendency towards an internal, fulvous, lunular capping of these such as is often (but not invariably) found in *falacer* and *liparops*.

The differences on the under surface are more numerous but less

¹ Opinion should, however, be reserved on the validity of this apparently hitherto unrecognized character in the *calanus-falacer* populations until more material has been studied critically.

easily described. Noticeable is a general lack of contrast between the light and dark markings of the transverse spots and the ground color. The strikingly wide, markedly duplex segments of the transverse spots and lines, so characteristic of all *liparops*, are in *kingi* much more modestly developed. In this *kingi* bears a greater superficial resemblance to *falacer*. In two of the five males of the *kingi* type series these segments are predominantly simplex, almost entirely lacking the basal white edging, but in the other three males and in the females there is definite duplexity. The width of these markings is much reduced from that of *liparops*, although in one male they are nearly as wide as in occasional specimens of *liparops strigosus*.

The pattern of dislocation of the segments of these markings, however, is quite that of *liparops*, although less accentuated, and differs from that of *falacer*. This is especially evident on the forewing, where in *falacer* the line of the segments is habitually continuous, though often tortuous, and is only rarely completely dislocated, and even in the latter case the dislocation is less pronounced than in *kingi*. On the hind wing of *kingi*, however, the dash in cell Sc (which in *liparops* is so far basally displaced as to fall in line with the cell-end dash) is more in agreement with that of *falacer*, being only slightly displaced basally relative to the dash in cell Rs and well distad of the cell-end dash. The markedly diagonal slant of the segment in cell Cu₂ of the hind wing is quite as in *liparops* and greatly different from the position (more parallel to the outer margin) in *falacer*, but its tendency (more marked in the males) to costad obsolescence is unique in *kingi*.

Like *liparops*, *kingi* has an abundance of submarginal fulvous on the under side of the hind wing. It also shares with *liparops* the distinct, internal, fulvous cap basad to the bluish quadrate spot in cell Cu₂. This internal fulvous capping is largely lacking in the other species of the group, except in occasional aberrant specimens, and even there it is only faintly present. The olive green basal iridescence seems a feature peculiar to *kingi*, but its obscure nature makes it an unsatisfactory character.

The more extensive fulvous tips of the antennae are, again, similar to those of *liparops*. In *falacer* these are much less extensive, especially in males. Though only brief mention of them is possible here, two other close relatives of *kingi*, both Palearctic, deserve comment. The first is the well-known *spini* of Denis and Schiffermueller. The second is closely allied to the last and

hitherto has been considered a subspecies of it, *laticornis* Fixsen. About this latter name, however, there is some confusion, as Ruehl named an aberration, *major*, which may well be the same. In the collection of the Carnegie Museum there is a short series from Manchuria that agrees with the description in Seitz (1908, p. 265) of *laticornis*. Examination of these and of several *spini* from various European and Asiatic localities reveals the following information. Firstly, our "*laticornis*" is specifically distinct from *spini* and is probably confined to eastern Asia. *Spini*, in several subspecies, extends from western Europe across Eurasia at least as far east as the province of Kansu, China. Of the two, "*laticornis*" is apparently the more closely related to *kingi* and *liparops*, agreeing in several traits of the genitalia as well as in its possession of a supplementary androconial area in the male. The pattern below is very different, strongly resembling that of *spini*. *Spini* lacks the supplementary androconial area, but is otherwise quite similar to "*laticornis*," though differences in the male genitalia confirm their specific distinctness. In résumé, "*laticornis*" and *spini* both appear to belong to the *liparops-kingi* section of the *falacer* group but probably stem from a common ancestor of *liparops* and *kingi*.

GENITALIA

Both the male and female genitalia of *kingi* show excellent characters to distinguish this species from both *liparops* and *falacer* (fig. 1). Only the most major characters are discussed below, since comparison of other characters would necessitate not only a more extended treatment than is warranted here, but also study of many more specimens of *kingi* than are now available.

MALE GENITALIA (FIG. 1A, 1D)

Labides (paired, rounded, hairy, dorsal projections) projecting shortly, but deep dorsoventrally. Falces (heavily chitinized, paired, sharp, subdorsal structures which, with the paired labides, characterize the Lycaenidae) tapering sharply subterminally, slightly hooked terminally. Little sign of any paired, transverse, well-chitinized projections from the posteroventral angles of the tegumen such as (fig. 1B) characterize *liparops*. Harpes long and slender, distinctly sinuate from ventral aspect, their terminal portions bent ectad. Saccus short, bent strongly cephalad and therefore appearing shorter from caudoventral aspect than it really is. Aedeagus relatively stout, containing (as do the other related

species) one long and one short cornutus and having terminally a ventral, heavily chitinized strip that is weakly toothed terminally. The long cornutus has a number of short, subequal, triangular spines subterminally and terminally. The short cornutus has a number of somewhat larger such spines and one very large, dorso-terminal spine.

COMPARISONS WITH OTHER SPECIES

From *liparops* (fig. 1B, 1E), apparently its closest relative, *kingi* is distinguished as follows: (1) The harpes of *liparops* are relatively shorter and broader, with more prominent, rounded, lateral projections, and are more simply curved, with their tips bending mesad. (2) *Liparops* has a well-chitinized pair of transverse projections from the posteroventral angles of the tegumen, which are almost entirely lacking in *kingi*. (3) The saccus of *liparops* is not so bent cephalad and therefore appears longer in ventral view. (4) The large, dorsal spine at the tip of the short cornutus of the aedeagus of *liparops* is proportionately smaller and less outstanding from the other spines, and the ventral, chitinized strip at the tip of the aedeagus of *liparops* is much smaller and less perceptibly toothed.

From *falacer* (fig. 1C, 1F) *kingi* is distinguished as follows: (1) The labides of *falacer* are much shorter and less extensive dorsoventrally. (2) The saccus of *falacer* is much more extensive. (3) The harpes of *falacer* are much shorter, nearly straight, blunter terminally, and have much smaller lateral projections. (4) The short cornutus of the aedeagus of *falacer* has only three or four very small spines at its tip, and the terminal, ventral, chitinized strip of the aedeagus of *falacer* is more strongly and extensively toothed.

In general the male genitalia of *kingi* resemble those of *liparops* more strongly than they do those of *falacer*. This similarity is especially noticeable in the general shape and proportions of the labides; in the abruptly tapering falces; in the longer, pointed, and curved harpes with more prominent, rounded, lateral projections; in the shorter saccus; in the relatively shorter, thicker aedeagus; and in the prominence of one dorsal tooth at the tip of the short cornutus. *Kingi* differs from *liparops* and resembles *falacer* more, however, in the absence of the paired, transverse processes of the posteroventral angles of the tegumen and also in the greater prominence and more distinct toothings of the chitin-

ized, ventroterminal strip on the aedeagus. It is worth noting here that in *Strymon caryaevorus* McDunnough the paired, transverse processes of the tegumen are present as in *liparops*, but are even larger and strongly spiculate or fine toothed.

FEMALE GENITALIA (FIG. 1G)

Ostium extremely wide, tapering dorsocaudally to a blunt point, its dorsocaudal edges strongly spiculate. Ductus bursae relatively short, tapering strongly from the wide, transverse, slit-like ostium. Apophyses long. A pair of weakly chitinized, rounded, lobe-like pockets in the membranous sternite just cephalad of the ostium and ventrad of the ductus. Bursa long, oval, with a distinctly narrower cervix at the juncture with the ductus bursae. This cervix distinctly chitinized, especially dorsally, and with a pair of distinct, lateral, longitudinal, infolded grooves. Two signa, one dorsal and one ventral; each of these is flat and weakly chitinized where in contact with the wall of the bursa, but has an inward projecting, more heavily chitinized ridge that may bear a few small teeth, and consistently has two prominent, spine-like teeth projecting cephalad.

COMPARISONS WITH OTHER SPECIES

From *liparops* (fig. 1H) *kingi* is distinguished as follows: (1) the whole eighth abdominal segment, most noticeably the tergite, is proportionately longer. (2) The ostium of *liparops* is much smaller and not nearly so transverse and slit-like as that of *kingi*; like that of *kingi*, the ostium of *liparops* tapers to a dorsal-caudal point, but its edges are not spiculate. (3) The ductus bursae of *liparops* is relatively shorter than that of *kingi*; because of the narrower ostium it does not appear to taper so strongly. (4) The apophyses are relatively shorter in *liparops* than in *kingi*. (5) The rounded, lobe-like pockets in the sternite ventrad of the ductus are more extensive and more heavily chitinized in *liparops*. (6) The lateral infoldings of the cervix of the bursa are deeper and more heavily chitinized in *liparops*. (7) The signa of the bursa appear to be proportionately larger in *liparops* and to have the two large teeth nearer the cephalic end of each and more directed cephalad.

From *falacer* (fig. 1I) *kingi* is distinguished as follows: (1) The ostium of *falacer* tapers very little dorsocaudally, is there broad and rounded, and has only extremely minute spiculations, if any,

along its dorsocaudal edges. (2) The ductus bursae of *falacer* is much longer than that of *kingi*. (3) The paired, rounded, lobe-like pockets in the sternite of *kingi* and *liparops* are in *falacer* either absent or, if present, very small, inconspicuous, and unchitinized. (4) The narrowed cervix of the bursa of *falacer* is less extensively chitinized than that of *kingi*, and largely lacks the prominent, longitudinal, lateral, infolded grooves. (5) The remaining portion of the bursa of *falacer* is relatively shorter and more rounded. (6) The signa of *falacer* have more smaller teeth in addition to the two large ones; there is great individual variation in these smaller teeth.

In general the female genitalia of *kingi* resemble those of *liparops* more strongly than they do those of *falacer*. This similarity is especially marked in the transverse, slit-like shape of the ostium, the dorsocaudal tapering of the ostium to a point, the relatively short ductus bursae, the more extensively chitinized, narrow cervix of the bursa, and the absence of, or fewer, small teeth on the signa. It may be noted here that the female genitalia of *S. caryaevorus* McDunnough strongly resemble those of *falacer* in these respects, although distinguished by possessing a prominent, triangular, heavily chitinized projection at either side of the ostium.

PHYLOGENY

There seems no doubt that a perfectly distinct species is involved and that its closest relative is *Strymon liparops* rather than any of the other related species (*falacer*, *calanus*, *caryaevorus*, *edwardsii*). This is abundantly shown by the displacement of the outer margin in the cubito-anal region of the hind wing; the pattern of line element dislocation below; the abundant submarginal fulvous below, especially that capping the bluish quadrate spot; the secondary androconial area; the tendency of the scent pad to project along the veins; the twisting of the Cu₂ tail; the more extensively fulvous antenna tip; and the characters of both the male and female genitalia described above.

Beyond this statement of the relatively close relationship between *kingi* and *liparops* we do not care to go at present. As discussed above, there appears to be something of a discernible relationship between these two Nearctic species and the Palearctic *spini* Denis and Schiffermueller and our supposed *laticornis* Fixsen. Further knowledge of the Palearctic species, especially of their

Asiatic distribution, must be obtained before any more extensive phylogenetic conclusions are warranted.

ECOLOGICAL DATA

Although no life history data are available for *kingi*, a certain amount of valuable information was received from Messrs. King and Robin Harris about the environments in which, respectively, the Savannah, Georgia, and Helen, Georgia, specimens were taken.

The Savannah specimens were taken along the partly cleared edge of a heavily wooded area bordering a swampy creek, flying in company with a great many *S. favonius* Abbot and Smith, a considerable number of *S. falacer* Godart, and a few *S. l. liparops* Boisduval and LeConte. Both sexes of all these species were taken. Both chinquapin (*Castanea*, probably *alnifolia*)¹ and farkleberry (*Vaccinium arboreum*) were in full bloom. *S. kingi* and *liparops* appeared to visit the blooms of only the *Castanea*, none being taken on the *Vaccinium*. A few *falacer* and many *favonius* were taken on the *Vaccinium* blossoms. All the *Strymon* visiting the *Castanea* appeared to prefer the higher flowers, many of which were out of net reach. Only some of the blooming *Castanea* plants were consistently visited. The latter part of the morning and midafternoon were the best times. Other trees identified in the immediate vicinity were: wild cherry (*Prunus serotina*), sweet gum (*Liquidambar styraciflua*), willow (*Salix chapmanii*?), water oak (*Quercus nigra*), and hickory (*Carya* sp.).

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We are very grateful to Mr. H. L. King for his patience in permitting us to keep for extended study not only the specimens of *Strymon kingi* but also much other very valuable hairstreak material from Savannah, including specimens of the almost unknown *S. liparops liparops*.

We are especially indebted to Dr. Ralph Chermock of the University of Alabama and to Messrs. Lucien and Robin Harris, Avondale Estates, Georgia, for the loan of specimens of *S. kingi* as well as of other species of *Strymon*. In addition to these, a great many other collectors and museum authorities have generously lent several hundred specimens of *S. falacer* and other hairstreaks

¹ We are greatly indebted to Dr. E. J. Alexander of the New York Botanical Garden for identifying the plants mentioned here, from specimens and photographs taken by Mr. King.

which are being studied in the preparation of a paper on *falacer* and its relatives. Their kindness will, of course, be acknowledged in detail when results of this further study are published.

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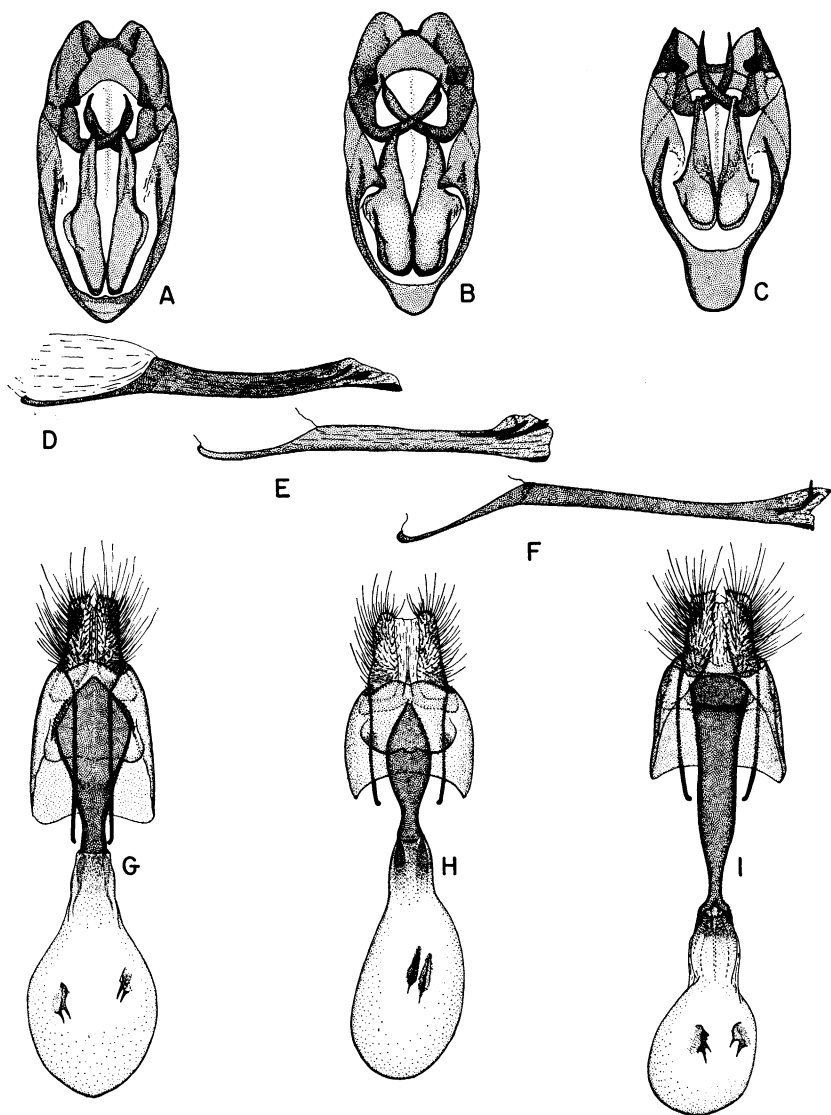


FIG. 1. A-C. Genitalia, ventrocaudal aspect. A. *Strymon kingi* Klots and Clench, holotype male. B. *S. liparops liparops* Boisduval and LeConte, male, Savannah, Georgia. C. *S. falacer* Godart, male, Savannah, Georgia. D-F. Aedeagus, lateral aspect. D. *S. kingi* (as above). E. *S. l. liparops* (as above). F. *S. falacer* (as above). G-I. Genitalia, ventral aspect. G. *S. kingi* Klots and Clench, paratype female. H. *S. liparops strigosus* Harris, female, Southfields, New York. I. *S. falacer* Godart, Savannah, Georgia.

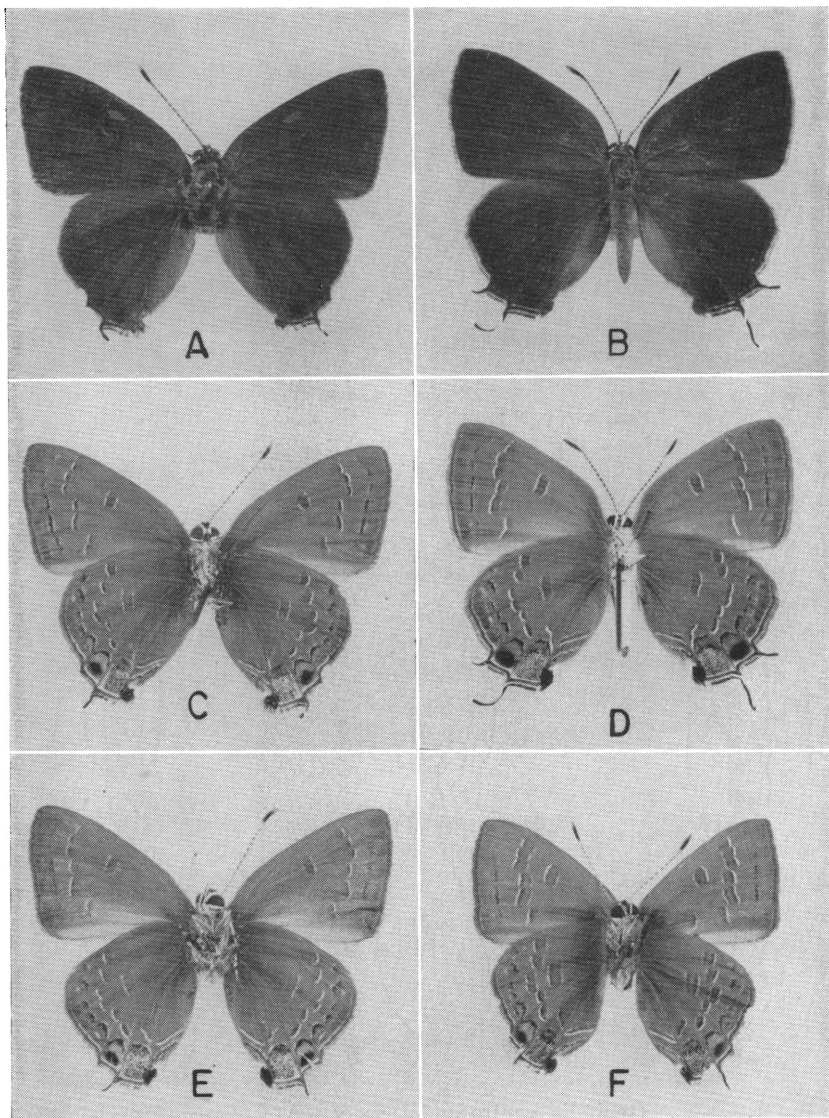


FIG. 2. *Strymon kingi* Klots and Clench. A. Holotype male, upper side. B. Allotype female, upper side. C. Holotype male, under side. D. Allotype female, under side. E. Paratype male, under side, Savannah, Georgia, May 20, 1949. F. Paratype male, under side, Savannah, Georgia, May 20, 1950. All $\times 1\frac{1}{2}$.

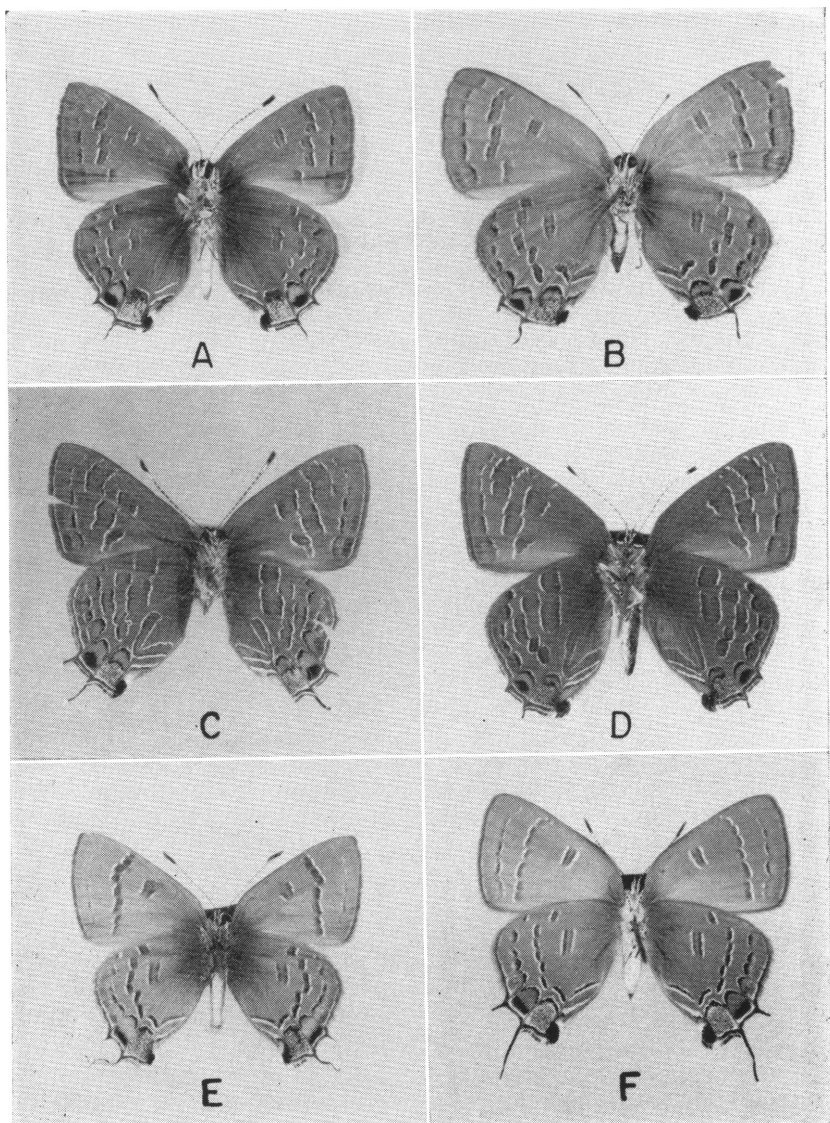


FIG. 3. A, B. *Strymon kingi* Klots and Clench. A. Paratype male, under side, Savannah, Georgia, May 24, 1951. B. Female, under side, Helen, White County, Georgia. C. *S. liparops liparops* Boisduval and LeConte, under side, Savannah, Georgia, May 10, 1949. D. *S. liparops strigosus* Harris, male, under side, Ithaca, New York. E, F. *S. falacer* Godart, Savannah, Georgia. E. Male, under side. F. Female, under side. All $\times 1\frac{1}{2}$.

