

**THE GENUS *AUSTROARGIOLESTES* KENNEDY
(ZYGOPTERA: MEGAPODAGRIONIDAE)**

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Austroargiolestes Kennedy is redefined and its spp. are reviewed. Four new spp. are described and illustrated in detail, and a new name is proposed for a ssp. of *Austroargiolestes icteromelas* (Selys) which had been described as *Argiolestes calcaris tenuis* Fraser. Generally, diagnoses and illustrations only are given for previously known spp. The following spp. and ssp. are recognized: *Austroargiolestes alpinus* (Tillyard), *A. amabilis* (Förster), *A. aureus* (Tillyard), *A. brookhousei* sp. n., *A. calcaris* (Fraser), *A. christine* sp. n., *A. chrysoides* (Tillyard), *A. elke* sp. n., *A. icteromelas icteromelas* (Selys), *A. icteromelas nigrolabiatum* nom. nov., and *A. isabellae* sp. n. A key to males and females of all species-group taxa now recognized is presented.

INTRODUCTION

Hitherto, in addition to *Podopteryx* Selys, *Argiolestes* Selys was the only widely recognized genus of Megapodagrionidae in Australia (FRASER, 1957, 1960; O'FARRELL, 1970; WATSON, 1974, 1977, 1981), although KENNEDY (1925) had placed the Australian species into two genera, *Archiargiolestes* and *Austroargiolestes*.

Recent collecting of Australian *Argiolestes* s.l. and subsequent study of these specimens, plus material available in institutional collections, indicated that there are several unnamed species of this group in Australia, led to the discovery of sympatrically-occurring forms hitherto considered as subspecies of a single species, and revealed some synonymies.

In order to permit clear diagnoses of new species all existing taxa of Australian *Argiolestes* s.l. had to be re-examined thoroughly. These investigations revealed clear evidence of distinct species-groups within Australian *Argiolestes* s.l. and

made at least *Austroargiolestes* Kennedy appear justified as distinct entity as had previously been supported by RACENIS (1959) and LIEFTINCK (1975, 1976).

Although studies of the remaining species of Australian *Argiolestes* s.l. are still in progress, we feel that it is already appropriate to present this revisional work on *Austroargiolestes*.

After a historical account and a redefinition of *Austroargiolestes* Kennedy the species are dealt with in the following order:

<i>Austroargiolestes calcaris</i> (FRASER, 1958)	<i>A. amabilis</i> (FÖRSTER, 1899)
<i>A. christine</i> sp. n.	<i>A. alpinus</i> (TILLYARD, 1913a)
<i>A. elke</i> sp. n.	<i>A. brookhousei</i> sp. n.
<i>A. isabellae</i> sp. n.	<i>A. icteromelas</i> (SELYS, 1862)
<i>A. aureus</i> (TILLYARD, 1906)	<i>A. i. icteromelas</i> (SELYS, 1862)
<i>A. chrysoides</i> (TILLYARD, 1913b)	<i>A. i. nigrolabiatus</i> nom. nov.

The new species are described and illustrated in detail. Descriptive history, descriptions of the glans penis and the male anal appendages and illustrations of diagnostic characters and variability are presented for previously known forms.

In general, the terminology used for the descriptions follows CHAO (1953) and O'FARRELL (1970). In order to make descriptions of male anal appendages uniform, clear and useful we use some additional terms explained in Figure 1, as follows: basal portion (bp) for the portion from the posterior dorsal margin of tergite 10 to the level of the basal angle or curve (ba); median portion (mp) for the portion beginning at the level of the basal angle and ending at the level of the inner subapical angle or curve (sa); distal portion (dp) for the adjacent terminal part; the distance between the inner edges at the base is termed the basal gap (bg); and the distance between the subapical angles, the subapical gap (sg).

The area enclosed by the male superior anal appendages generally appears much more characteristic than the shape of the appendages themselves. Illustrations of the male superior anal appendages of all species in comparable positions have, therefore, been prepared; they are presented on two facing plates (Figs 139-150).

Colours are described from preserved specimens considered least discolored, unless stated otherwise. Generally, we have tried in the first instance to describe the colours of strongly pruinescent species from specimens with the pruinescence removed, and described degree and extent of the pruinescence at the end of the descriptions.

The origin (locality) of the specimens used for the illustrations is indicated if this appears necessary (because of geographic variability etc.).

The names of institutions in which material mentioned in this paper is lodged, are abbreviated, as follows:

AM	Australian Museum, Sydney
ANIC	Australian National Insect Collection, CSIRO, Canberra
BMNH	British Museum (Natural History), London
GT	Collection Günther Theischinger
IRNB	Institut Royal des Sciences Naturelles de Belgique, Brussels

- MV Museum of Victoria, Melbourne
 QM Queensland Museum, Brisbane
 UQ University of Queensland, Brisbane
 ZMAA Zoological Museum, University of Michigan, Ann Arbor.

Specimens are listed in alphabetical order of locality names.

GENUS *AUSTROARGIOLESTES* KENNEDY

Austroargiolestes KENNEDY, 1925: 294.

Type species: *Argiolestes icteromelas* SELYS, 1862.

Risiolestes FRASER, 1926: 486.

Type species: *Argiolestes icteromelas* SELYS, 1862.

SELYS (1862) described *Argiolestes* for the three species *Agrion australis* Guerin from New Guinea and *Argiolestes icteromelas* Selys and *Argiolestes griseus* Hagen in Selys from Australia. *A. australis* was subsequently designated type species (KIRBY, 1890). On the basis of wing shape and venation, SELYS (1862) subdivided *Argiolestes* into two species-groups, the *australis* group including only *A. australis*, and the *icteromelas* group in which he included the two Australian species.

After TILLYARD (1906, 1913a, 1913b) and SJÖSTEDT (1917) had described several more distinct forms of Australian *Argiolestes*, KENNEDY (1925), on the basis of venational characters, split *Argiolestes* into several genera including the Australian *Archiargiolestes* which he based on *A. pusillissimus* Kennedy, and *Austroargiolestes* based on *A. icteromelas*. Kennedy listed *A. pusillissimus*, *A. griseus* (which he wrongly considered to be a Western Australian species), and *Argiolestes pusillus* Tillyard under *Archiargiolestes*, and *Argiolestes icteromelas*, *A. alpinus* Tillyard, *A. amabilis* Förster, *A. aureus* Tillyard, *A. chrysoides* Tillyard and *A. minimus* Tillyard under *Austroargiolestes*. FRASER (1926) established another generic name, *Risiolestes*, for *A. icteromelas*. The synonymy of *Risiolestes* Fraser with *Austroargiolestes* Kennedy was first noted by Ris in the unpublished "Ris Catalogue" of Odonata, and was later recorded by DAVIES (1981).

After LIEFTINCK (1956) had pointed out that a comprehensive revision of *Argiolestes* s.l. would be required before generic limits could be established, RACENIS (1959) attempted a new classification of all Megapodagrionidae, based on venational characters only. In this classification he erected the tribe Austroargiolestini to contain *Austroargiolestes* Kennedy, whereas *Archiargiolestes* Kennedy was united with *Argiolestes* and several other non-Australian genera in the tribe Argiolestini.

FRASER (1958, 1959) described further Australian forms of *Argiolestes* but neither in these publications, nor in his "reclassification" (FRASER, 1957), or in his comprehensive treatment of the Australian odonate fauna (FRASER, 1960),

did he mention KENNEDY's (1925) genera *Austroargiolestes* and *Archiargiolestes*, his own genus *Risiolestes* or RACENIS' (1959) tribes. However, FRASER (1960), on the basis of characters of the male superior anal appendages, separated two groups of Australian *Argiolestes*, corresponding with KENNEDY's (1925) genera *Austroargiolestes* and *Archiargiolestes* except that *A. minimus* was placed with the other Western Australian species and *A. griseus*, that *A. fontanus* Tillyard and *A. metallicus* Sjöstedt, neither mentioned by KENNEDY (1925), were placed together with *A. griseus*, and that *A. pusillissimus* Kennedy was not mentioned.

LIEFTINCK (1975, 1976) resurrected *Austroargiolestes* and stated that the Argiolestinae could be split most conveniently into three genera, *Argiolestes* Selys, *Austroargiolestes* Kennedy and *Podopteryx* Selys, but, unfortunately, did not list the species he thought belonged to any of them.

WATSON (1977), following LIEFTINCK (1956) and FRASER (1960), did not discuss the generic placement of the Western Australian species of *Argiolestes* but, arguing from the shape of the male superior anal appendages, clearly defined an *A. icteromelas* group and an *A. griseus* group in eastern Australia. He considered all Western Australian species of *Argiolestes* to be more closely related to the *A. griseus* group than to the *A. icteromelas* group, and considered them as members of the *A. griseus* group. He noted, however, that the western species are more closely related amongst themselves than any is to any eastern member of the *A. griseus* group. DAVIES (1981) finally recognized *Austroargiolestes* but included in it *Archiargiolestes*, which we do not consider synonymous with *Austroargiolestes* (cf. below).

For the present project and for a forthcoming revision of the eastern Australian members of the "*A. griseus* group" sensu WATSON (1977) we studied not only the venational characters and features of the male anal appendages but also the secondary genitalia of all Australian taxa of *Argiolestes* s.l.

The evidence now available indicates that there are at least three distinct groups in the Australian species of *Argiolestes* s.l.: an eastern group centered around *A. icteromelas*, an eastern group centered around *A. griseus*, and the western group of species. Although the interrelationships of these groups are not yet clear, particularly in the case of the *A. griseus* group and the Western Australian species, the different specializations suggest that distinction at generic level is appropriate.

In this paper, following KENNEDY (1925), RACENIS (1959), LIEFTINCK (1975, 1976) and DAVIES (1981), the genus *Austroargiolestes* is re-established for the species listed by WATSON (1977) under the *Argiolestes icteromelas* group, and for four previously undescribed species. A taxonomic treatment of the remaining Australian species of *Argiolestes* s.l. is left to the revision of the *A. griseus* group (Theischinger & Watson, in preparation).

DIAGNOSIS OF *AUSTROARGIOLESTES* KENNEDY
Adults

Wings. — 13-25/12-23 postnodals; pterostigma overlying $1\frac{1}{2}$ -3 cells; brace vein present; IR3 arising at subnodus; R4 arising proximal to subnodus; 4-9/3-9 crossveins between subnodus and origin of R3; discoidal cell with opposite sides not differing much in length, posterodistal angle at least 45° ; 3-4 postdiscoidal cells; Ac generally at about level of $1/2$ - $3/4$ distance Ax1-Ax2; anal field generally with 1-4 rows of cells.

Secondary genitalia. — Glans penis with U- or V-shaped basal sclerite which is closed for some distance and convex ventrally, and adjacent, a membranous lobe; tip a simple, more or less rounded or widened and rounded lobe, or complicated, but never widely bilobed.

Segment 10 of male. — No conspicuous posterodorsal V-shaped membranous median cleft.

Male anal appendages (Fig. 1). — Superior appendages forcipate, evenly curved, generally wide in basal third, irregularly tapering in median third, narrow in distal third. Outer basal margins set well inside line of expanded abdominal segment 10, inner basal margins close together. Generally an inner basal angle (ba) and inner subapical angle (sa); all possess a ventral subapical spur (vs). Inferior appendages very short, never reaching beyond basal angle of superiors, strongly sclerotized and subtriangular or less strongly sclerotized and of variably irregular shape and with rounded apical lobe.

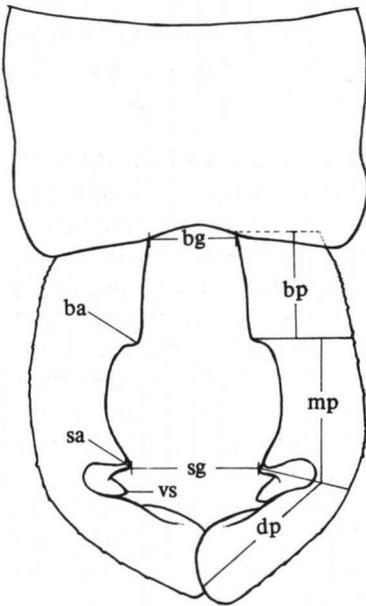


Fig. 1. Terminology used in this paper for the descriptions of the superior anal appendages of male *Austroargiolestes* (illustrated from *A. brookhousei*, sp. nov.): ba = basal angle; bg = basal gap; bp = basal portion; dp = distal portion; mp = medial portion; sa = subapical angle; sg = subapical gap; vs = ventral spur.

Larvae (as far as known)

Antennae long; labium markedly longer than its greatest width; ligula evenly convex with only very slight indication of median cleft; labial palp tridentate apically; legs long and slender; caudal lamellae in horizontal position, long,

leaf-shaped, slightly concave dorsally with midrib projecting ventrally only.

AUSTROARGIOLESTES CALCARIS (FRASER)

Figures 2-10, 139, 151

Argiolestes calcaris FRASER, 1958: 70.

Primary type. — Lectotype ♂ (ANIC Type No. 9845): New South Wales, Mt Kosciusko, 5000 ft, 18.I.1954, R. Dobson (WATSON, 1968). Seen.

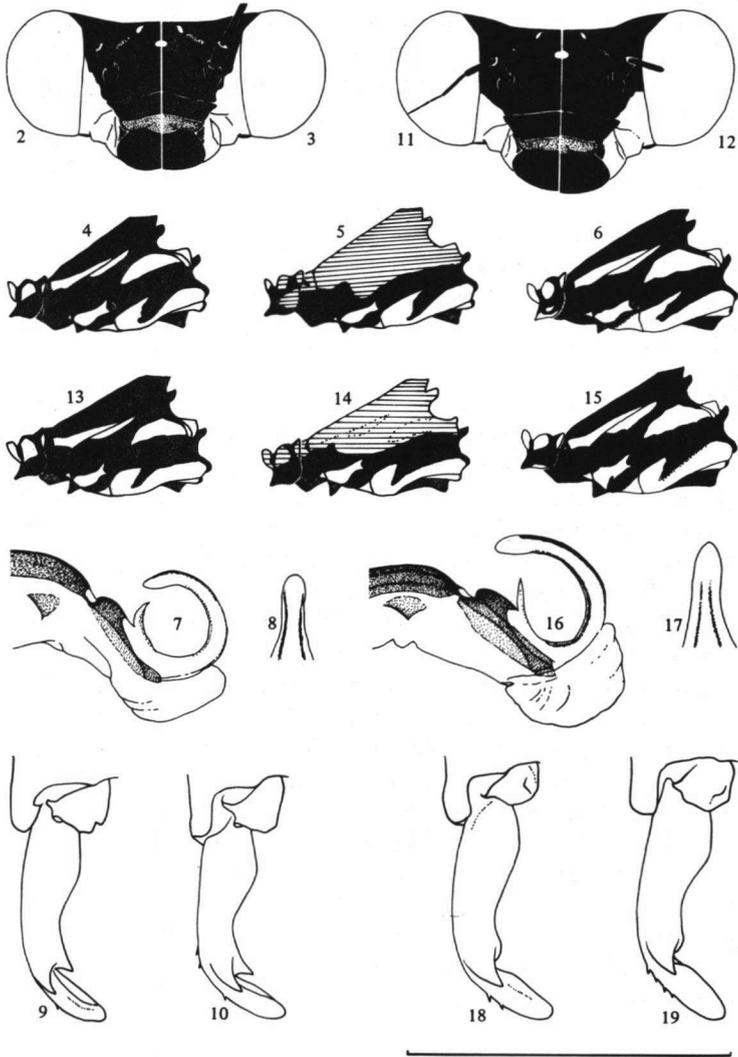
Material examined. — 41 ♂, 48 ♀, including paralectotypes, from south-eastern New South Wales and Victoria (mainly the alpine region); northern-most locality Kanangra Walls, Blue Mountains (33°59'S), southern-most locality Kinglake 37°16'S); Nov.-Mar.; AM, ANIC, GT, IRNB, MV.

FRASER (1958) described both sexes of *A. calcaris* from Mt Kosciusko in south-eastern New South Wales. FRASER (1959) provided a brief description of *A. calcaris* race *tenuis* but failed to indicate type locality, or to designate types; he did, however, also discuss, under this name, material from Barrington Tops in north-eastern New South Wales. FRASER (1960) illustrated, under *A. c. calcaris*, the male anal appendages of *A. calcaris* and recorded *A. c. calcaris* from Mt Kosciusko, Hunter's Springs and Barrington Tops, and *A. c. tenuis* only from Stoney Creek near Rockhampton. WATSON (1968) designated a lectotype for *A. c. tenuis* from Stoney Creek, and WATSON (1974) recognized that *A. c. tenuis* is identical with *A. icteromelas*. We completely agree with WATSON (1974) and formally synonymize *A. c. tenuis* with *A. icteromelas* (see below). It is our view that the specimens from Barrington Tops, which FRASER (1959) listed under *A. c. tenuis*, later recorded from there as *A. c. calcaris* (FRASER, 1960) and the material FRASER (1960) recorded from Hunter's Springs belong to a new species, *A. christine* sp. n. (cf. below).

We illustrate the pattern of the head of *A. calcaris* (Figs 2, 3), the thoracic pattern (Figs 4-6) and the wings (Fig. 151), and describe and figure details of male secondary genitalia and anal appendages.

Glans penis (Figs 7, 8). Basal sclerite with rounded, backwardly directed hummock; flagellum with apex tongue-shaped, narrow and not or hardly dilated.

Male anal appendages (Figs 9, 10, 139). Superior appendages with median portion considerably longer than either basal or distal portion, which do not differ much in length; basal angle inconspicuous, widely rounded; inner margin of median portion evenly curved (concave) throughout; subapical angle rather sharp and directed posteromedially; distal portion short and slim; ventral spur curving medially at or proximal to level of outer edge of distal portion. If the inner edges of the basal portion of the appendages are set parallel, the subapical gap is less than 1.5 times as wide as the basal gap (range 1.22-1.44; n = 12), and the distance between the appendages at about midway of the median portion is



Figs 2-10. *Austroargiolestes calcaris* (Fraser): (2-3) Head, frontal: 2, male; 3, female; — (4-6) Thorax, lateral: 4-5, male: 4, subadult; 5, pruinescent; 6, female, subadult; — (7-8) Glans penis: 7, lateral; 8, tip, ventral; — (9-10) Male, right anal appendages, ventral, 2 different specimens.

Figs 11-19. *Austroargiolestes christine* sp. n.: (11-12) Head, frontal: 11, male; 12, female; — (13-15) Thorax, lateral: 13-14, male: 13, subadult; 14, pruinescent; 15, female, subadult; — (16-17) Glans penis: 16, lateral; 17, tip, ventral; — (18-19) Male, right anal appendages, ventral, 2 different specimens. — [Scale line: 11.00 mm for Figs 4-6, 13-15; 5.00 mm for Figs 2, 3, 11, 12; 2.50 mm for Figs 9, 10, 18, 19; 1.25 mm for Figs 7, 8, 16, 17. Cross-hatching indicates pruinescence].

greater than the width of the subapical gap. Inferior appendages very short, truncate, their shape dependent to some extent on degree of sclerotization of the individual and on the method of preservation.

AUSTROARGIOLESTES CHRISTINE SP. N.

Figures 11-19, 140, 152

Argiolestes calcaris tenuis Fraser; FRASER, 1959: 360 (in part).

Argiolestes calcaris calcaris Fraser; FRASER, 1960: 20 (in part).

Material examined. — **Holotype** ♂ (Type No. 9895): New South Wales, Barrington Tops, Horse Swamp, 9.XII.1979, P. Brookhouse (ANIC). — **Paratypes**: New South Wales: 7 ♂, 14 ♀, same data as holotype (ANIC); 1 ♂, 3 ♀, Barrington Tops, 7-8.XII.1981, G. Theischinger and L. Müller (GT); 4 ♂, 5 ♀, Barrington Tops, creek near Big Hole, 27.XI.1979, G. Theischinger and L. Müller (ANIC); 8 ♂, 7 ♀, Barrington Tops, Dilgry River, 10.XII.1979, P. Brookhouse (ANIC); 1 ♂, Barrington Tops, Hunter Springs, 12.I.1956, R. Dobson (ANIC); 2 ♂, 3 ♀, Barrington Tops, Polblue Creek and Swamp, 9.XII.1979, P. Brookhouse (ANIC); 1 ♀, upper Forbes River, 14 km S Kookaburra-Yarras, 9.II.1975, S. Bolin and Cage (ANIC); 1 ♀, Gibraltar Range, Dandahra Creek Falls, 11.XII.1974, S. Bolin and W. Stewart (ANIC); 7 ♂, 5 ♀, Gloucester Tops, 11.XII.1979, P. Brookhouse (ANIC); 14 ♂, 12 ♀, Gloucester Tops, Gloucester River and Gloucester Road, 30.XI.-1.XII.1976, P. Brookhouse (ANIC); 1 ♂, upper Manning River, 16.I.1948, A. Musgrave and I. McIver (AM); 1 ♀, upper Manning River, 4100 ft (= 1292 m), 16.I.1948, A. Musgrave and I. McIver (AM); 1 ♀, Tubrabucca, Barrington Tops, 27.XII.1946, A.B. (MV).

FRASER (1959), under *A. calcaris tenuis*, mentioned specimens from Barrington Tops but did not consider them typical, whereas FRASER (1960) recorded *A. c. calcaris*, most probably based on the same specimens, from Barrington Tops, Hunter's Springs and from Mt Kosciusko. From WATSON (1968) and from this study, it is now evident that *A. c. tenuis* was coined for a population of small individuals of *A. icteromelas* (q.v.) from near Rockhampton, and *A. calcaris* is as yet known to us only from the south-eastern alpine region and from Kanangra Walls in the Blue Mountains. It is our view, that FRASER's (1959, 1960) specimens from Barrington Tops and Hunter's Springs belong to a distinct species, *A. christine* sp. n., which is known also from Gloucester Tops and several other localities (cf. below).

Name. — The species is named after Mrs. CHRISTINE THEISCHINGER, *christine* being regarded as a noun in apposition to the generic name.

MALE

Dimensions. — Hindwing 22.0-25.0 mm; abdomen including anal appendages 27.5-31.0 mm.

Head (Fig. 11). — Labium dull yellow, labial palps black; genae ventral to antennal insertion, and base of mandibles yellow; median portion of mandibles black, apex brownish red; labrum metallic black; anteclypeus medium to dark brown, postclypeus shiny black; dorsal portion of genae, frons, vertex, occiput, postocular lobes and postgenae black, an indication of a rust coloured mark each

side of vertex between the lateral ocellus and the antenna; antennae blackish brown to black, often a yellowish ring around apex of scape.

Cervix and prothorax (Figs 13, 14). — Dorsal portion of eucervicale yellow, ventral portion dark greyish brown; postcervicale yellowish to brownish grey. Pronotum largely shiny black, posterior lobe, a large lateral patch on median lobe and lateral portion of posterior lobe yellow; episternum and epimeron brownish grey to black; coxa yellow to medium and greyish brown; trochanter, femur, tibia, tarsus and claws black.

Synthorax (Figs 13, 14). — Mesostigmatic lamina and spiracular dorsum dark brown to brownish black; collar, dorsal carina, antealar ridge and sinus black; mesanepisternum, mesepimeron and metanepisternum black with a narrow pale brownish yellow humeral stripe extending from the collar to about 2/3 way along mesopleural suture in mesanepisternum and for about the median half in mesepimeron, a subtriangular dull yellow patch, covering part of dorsal half of mesepimeron and metepisternum, and an elongate yellow mark ventral to metathoracic spiracle; mesokatepimeron and metakatepimeron black with posteroventral corner yellow; metepimeron yellow with black patch adjacent to metanepisternum restricted to about dorsal 2/3-3/4 and anterior half and not pointed or strictly wedge-shaped; subalar ridges largely black; coxae yellow with irregular dark greyish brown markings on outer surface, all other leg segments black; postcoxae yellow; poststernum greyish yellow to blackish brown with a little yellow; terga black and yellow.

Wings (Fig. 152). — Venation dark brown to black; membrane hyaline; humeral plate of forewing and intermediary piece and axillary plate of both wings dark reddish brown to black, humeral plate of hindwing largely yellow anteriorly, brown to black posteriorly; 14-17/13-15 postnodals; pterostigma black, overlying 1-2 cells, 1.0-1.3 mm long in forewing, 1.2-1.4 mm in hindwing; 4-7/3-5 crossveins between subnodus and origin of R₃; generally 3, rarely 4, postdiscoidal cells; anal field generally with one row of cells for its total length, very rarely double (divided) cells.

Abdomen. — Tergite 1 metallic black with yellow posterior edge and yellow anteroventral corner; tergite 2 metallic black with dark brown posterior edge and two yellow patches each side along ventral margin, a longer anterior and a smaller posterior; tergites 3-7 metallic black, each with a small oval to almond-shaped anterolateral mark each side, and very narrowly yellowish brown along ventral edge; tergites 8 and 9 metallic black with brown posterior edge; segment 10 black; sternite 1 dull yellowish grey to brownish grey, secondary genitalia whitish yellow to black; sternites 3-9 black; superior anal appendages black, inferiors dark brown.

Glans penis (Figs 16, 17). — Basal sclerite with rounded, backwardly-directed hummock when viewed from lateral aspect; apex of flagellum a simple tongue-shaped lobe, hardly or not at all dilated.

Anal appendages (Figs 18, 19). — Superior appendages with median portion considerably longer than either basal or distal portion, distal portion distinctly longer than basal portion; basal angle inconspicuous, widely rounded; inner margin of median portion evenly curved (concave) throughout; subapical angle directed posteriorly, not sharp; distal portion moderately long and thick; ventral spur curving medially at about level of outer edge of distal portion. If the inner edges of the basal portion of the appendages are set parallel to each other, the subapical gap is at least twice as wide as the basal gap (range 2.02-2.52, $n = 12$), and the distance between the appendages is greatest at the end of the median portion (subapical gap). Inferior appendages very short and wide, shape depending to some extent on degree of sclerotization and method of preservation.

Pruinescence. — In mature individuals generally covering postgenae, pronotum (particularly median portion), legs except for the tarsus and claws, front of synthorax, dorsal half to two thirds of mesepimeron and metanepisternum, synthoracic terga and sterna, parts of the wingbases and abdominal tergite 1.

FEMALE

Dimensions. — Hindwing 25.5-29.0 mm; abdomen 27.0-31.0 mm.

Head and thorax (Figs 12, 15). — Much as in male but generally slightly paler and pale markings more extensive.

Wings. — Much as in male; postnodals 16-18/15-16; pterostigma 1.1-1.4 mm long in forewing, 1.2-1.5 mm long in hindwing; 5-7/4-5 crossveins between subnodus and origin of R₃; 3-4 postdiscoidal cells; anal field slightly more frequently with double (divided) cells than in male.

Abdomen. — Much as in male; tergite 2 only with one yellow patch each side along anterior half of ventral margin; anal appendages black; ovipositor largely black.

Pruinescence. — Much as in male, not quite as strong but a little more extensive, covering also abdominal sternites and ventral edges of tergites and ovipositor in mature specimens.

AUSTROARGIOLESTES ELKE SP. N.

Figures 20-29, 141, 153

Material examined. — **Holotype** ♂ (Type No. 9896): Queensland, Finch Hatton Gorge, Nov. 1982, L. Müller and G. Theischinger (ANIC). — **Paratypes:** Queensland: 2 ♂, 11 ♀, same data as holotype (AM, ANIC, GT, MV); 1 ♀, Eungella National Park, 80 km NW Mackay, 18.X.1979, H.E. and M.A. Evans and A. Hook (UQ).

The existence of this species, which coexists in the type locality with *A. icteromelas*, had not previously been recognized. We have only found a single female in an institutional collection.

Name. — The species is named after Mrs ELKE MÜLLER, the wife of one of its collectors, *elke* being regarded as a noun in apposition to the generic name.

MALE

All available males are somewhat teneral. This is, most probably, the reason why they do not show any sign of pruinescence whereas adult females are strongly pruinescent. It should be mentioned that live males had at least the larger pale anterior synthoracic markings bright blue (dull yellowish in the preserved insects).

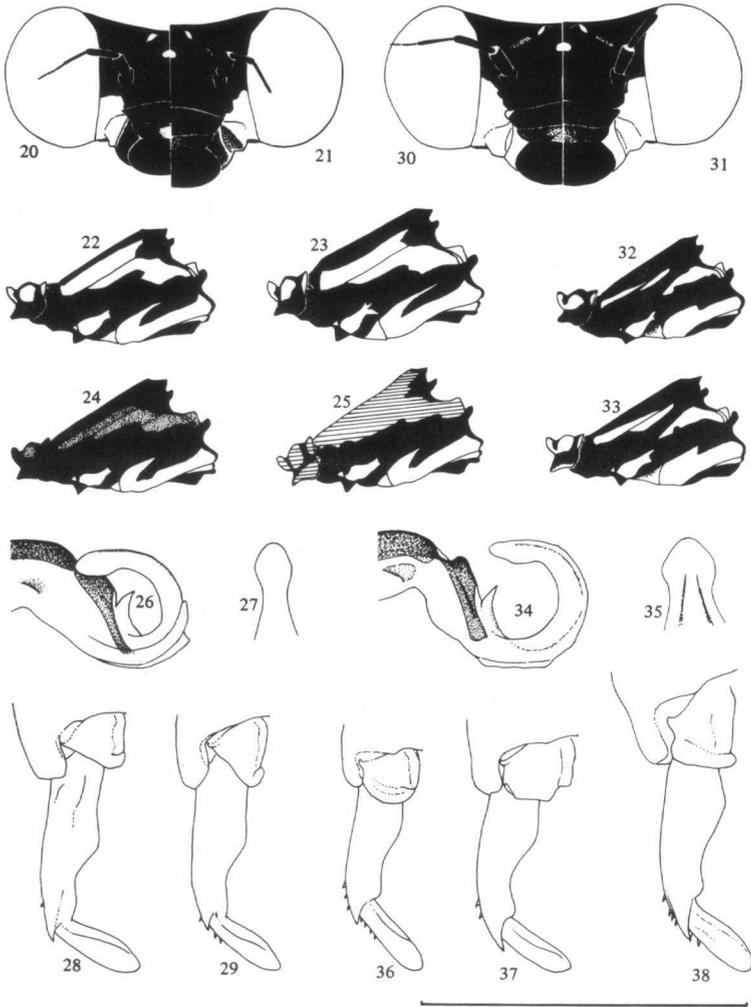
Dimensions. — Hindwing 24.5-26.5 mm; abdomen including anal appendages 33.0-35.0 mm.

Head (Fig. 20). — Labium including palps, and labrum black; genae below antennal insertion and extreme base of mandibles pale greyish to greenish yellow, median portion of mandibles black, apical portion reddish brown; anteclypeus pale greyish to greenish yellow medially, greyish black laterally; postclypeus black; dorsal portion of genae, frons, vertex, occiput, postocular lobes and postgenae black with green metallic reflection; antennae black.

Cervix and prothorax (Fig. 22). — Cervical sclerites brownish black except for dull yellow dorsal portion of eucervicale. Pronotum with anterior lobe yellow, median lobe black with large oval yellow patch each side, posterior lobe posterolaterally yellow, anteromedially and posteriorly along midline black, and furrows black; episternum and epimeron black; coxa greyish brown, trochanter, femur, tibia, tarsus and claws greyish black to black.

Synthorax (Fig. 22). — Mesostigmatic lamina, spiracular dorsum, collar, dorsal carina, antealar ridge and sinus black with bluish green metallic reflection; mesanepisternum, mesepimeron and metanepisternum largely black with bluish green metallic reflection; a pale brownish yellow humeral stripe, covering lateral (outer) half of mesanepisternum beginning from collar to about $4/5$ length, and about median portion of mesepimeron, and broadly connected dorsally with pale brownish yellow dorsolateral patch covering dorsal $1/6$ to $1/4$ of posterior half of metepimeron and anterior half of metanepisternum, and a smaller elongate brownish yellow patch ventral to the metathoracic spiracle; mesokatepisternum and metakatepisternum brownish black with yellow posteroventral corner; metepimeron pale brownish to greenish yellow with large shiny greenish black patch covering about dorsal $3/4$ of anterior half and dorsally connected to, ventrally widely separated from, black portion of metanepisternum by yellow wedge, continuing into a narrow line along metapleural suture; subalar ridges largely black; postcoxae pale brownish to greenish yellow; poststernum brown; coxae largely greyish brown to brownish black, somewhat paler posteriorly on outer surface, remainder of legs greyish to brownish black; terga yellowish to greyish brown and metallic greenish black.

Wings (Fig. 153). — Venation dark brown to black; membrane hyaline; humeral plate of forewing and intermediary piece of both wings brown to black, humeral plate of hindwing largely pale yellow anteriorly, otherwise brown to black, axillary plate of both wings brownish black and yellow, 22-23/20-22



Figs 20-29. *Austroargiolestes elke* sp. n.: (20-21) Head, frontal: 20, male; 21, female; — (22-25) Thorax, lateral: 22 male, subadult; 23, female subadult; 24, female, adult, with pruinescence rubbed off; 25, female, pruinescent; — (26-27) Glans penis: 26, lateral; 27, tip, ventral; — (28-29) Right male anal appendages, ventral, 2 different specimens.

Figs 30-38. *Austroargiolestes isabellae* sp. n.: (30-31) Head, frontal: 30, male; 31, female; — (32-33) Thorax, lateral: 32, male; 33, female; — (34-35) Glans penis: 34, lateral; 35, tip, ventral; — (36-38) Male, right anal appendages, ventral: 36, from Heathcote; 37, from Woodford; 38, from Wentworth Falls. — [Scale line: 11.00 mm for Figs 22-25, 32, 33; 5.00 mm for Figs 20, 21, 30, 31; 2.50 mm for Figs 28, 29, 36-38; 1.25 mm for Figs 26, 27, 34, 35. Cross-hatching indicates pruinescence].

postnodals; pterostigma greyish brown, overlying $1\frac{1}{2}$ -2 cells, 1.3-1.5 mm long in both wings; 8-9/7 crossveins between subnodus and origin of R3; generally 3, rarely 4, postdiscoidal cells; anal field generally with two rows of cells for at least half of its length, single cells for a longer distance proximally, for a short distance distally, no triple cells.

Abdomen. Tergite 1 brownish black with blue metallic reflection, posterior edge dull yellow; tergites 2, 8 and 9 and segment 10 brownish black with blue metallic reflection; tergites 3-7 brownish black to black with metallic reflection, each with a small almond-shaped pale greenish yellow anterolateral mark each side, these marks becoming increasingly smaller from tergite 3 to 7; sternite 1 variably brown; secondary genitalia from whitish yellow to black; sternites 3-9 blackish brown; superior anal appendages black; inferiors dark brown.

Glans penis (Figs 26, 27). — Basal sclerite with rounded basal angle when viewed from lateral aspect; apex of flagellum not wide, tongue-shaped and distinctly dilated.

Anal appendages (Figs 28, 29, 141). — Superior appendages with basal, median and distal portions of about the same length; basal angle widely rounded; inner margin of median portion more or less evenly curved; median portion tapering strongly in basal half and only slightly in distal half; subapical angle rounded and inconspicuous; ventral spur short, hardly curving medially at all, generally reaching beyond outer edge of distal portion (when viewed from dorsal aspect). If the inner edges of the basal portion of the appendages are set parallel, the median gap is more than twice as wide as the basal gap, and the tips touch or cross over slightly. Inferior appendages subtriangular, but with rounded apical lobe.

Pruinescence. — Not developed in the specimens available (see above).

FEMALE

Only a few of the available specimens are subadult. The subadult females correspond very well with the males in colour and pattern. Most of the available females, however, are mature and show strong pruinescence as described below.

Dimensions. — Hindwing 28.0-31.0 mm; abdomen 29.0-35.5 mm.

Head (Fig. 21), cervix and thorax (Figs 23-25). — Much as in male except that in mature females the pale markings are darker, more yellowish brown, and that the dark areas are generally less strongly metallic.

Wings. — Much as in male; postnodals 21-25/20-23; pterostigma 1.4-1.8 mm long in both wings, greyish brown to brownish black, 6-9/6-8 crossveins between subnodus and origin of R3.

Abdomen. — Much as in male; tergite 2 with a very small yellow comma-shaped anterolateral mark each side; sternite 2 blackish brown; anal appendages black; ovipositor largely black.

Pruinescence. — In mature specimens covering postgenae, pronotum (particularly median portion), front of synthorax, large anterior pale markings on sides of synthorax, synthoracic terga and sterna, coxae, trochanters and bases of femora, large parts of the wing bases, abdominal tergite 1 and abdominal sternites including ovipositor.

AUSTROARGIOLESTES ISABELLAE SP. N.

Figures 30-38, 142, 154

Material examined. — **Holotype** ♂ (Type No. 9897): New South Wales, Royal National Park, Uloola Swamps-Heathcote, 19.X.1984, G. Theischinger (ANIC). — **Paratypes:** New South Wales: 9 ♂, 4 ♀, same data as holotype (ANIC, GT); 1 ♀, Asquith (33°42'S, 151°06'E), 1.IX.46, F.O. Campbell (AM); 1 ♂, 1 ♀, Blackheath, 7.XII.1946, ANB (MV); 1 ♀, Blackheath, Blue Mountains, 25.X.1949, R. Dobson (ANIC); 72 ♂, 5 ♀, Blue Mountains, 1975/1976, c.u. (ANIC); 1 ♂, Como, Sydney, Sep. 1936, c.u. (ANIC); 1 ♀, Cowan (33°36'S, 151°10'E), 9.XI.1984, G. Theischinger and L. Müller (GT); 1 ♂, 1 ♀, Gundamain, Royal National Park, Oct. 1927, M. Fuller (ANIC); 1 ♂, 1 ♀, Heathcote Brook (34°05'S, 151°01'E), 16.IX.1982, 7 ♂, 3 ♀, s.l., 24.IX.1982, G. Theischinger (GT); 1 ♀, Kingfisher Pool near Waterfall (34°08'S, 151°00'E), 11.XI.1984, G. Theischinger (GT); 9 ♂, 2 ♀, E. of Lithgow, 6.XII.1979, G. Theischinger and L. Müller (ANIC); 1 ♀, Minnehaha Falls near Katoomba, 15.XI.1980, G. Theischinger (GT); 5 ♂, 1 ♀, Royal National Park, Sep. 1980, G. Theischinger (ANIC); 1 ♂, Wahroonga, Sydney, 24.X.1956, R. Dobson (ANIC); 1 ♂, Wentworth Falls, Blue Mountains, 2.XI.1949, R. Dobson (ANIC), 1 ♂, s.l., 19.XI.1980, G. Theischinger (GT); 1 ♂, 1 ♀, Woodford (33°44'S, 150°29'E), 14.XI.1926, Mackerras (ANIC).

The existence of this species has not previously been recognised. As some material was available in institutional collections it is possible that data on *A. isabellae* have been included by some authors under *A. icteromelas*. The two species coexist in many places and are superficially very similar.

Name. — The species is dedicated to Mrs ISABEL O'FARRELL.

MALE

Dimensions. — Hindwing 24.0-29.0 mm; abdomen including anal appendages 30.0-35.5 mm.

Head (Fig. 30). — Labium dull yellow, labial palps black; genae ventral to antennal insertion, and base of mandibles yellow, apical portion of mandibles reddish brown to black; labrum metallic black; anteclypeus yellow medially, greyish to blackish brown laterally; dorsal portion of genae, postclypeus, vertex, occiput, postocular lobes and postgenae black; frons black with a faint, rust-coloured mark each side of the vertex, between the lateral ocellus and the antenna; antennae black, often with yellowish ring around the apex of scape.

Cervix and prothorax (Fig. 32). — Dorsal portion of eucervicale yellow, ventral portion black; postcervicale dull yellowish brown. Pronotum largely black with narrow elongate brownish yellow lateral mark on anterior lobe, larger oval lateral patch of the same colour on median lobe and narrow elongate yellow lateral mark on posterior lobe; episternum and epimeron black; coxa brownish

yellow with ill-defined irregular brownish patches on outer surface; trochanter, femur, tibia, tarsus and claws dull black.

Synthorax (Fig. 32). — Mesostigmatic lamina, spiracular dorsum, collar dorsal carina, antealar ridge and sinus black; mesanepisternum, mesepimeron and metanepisternum black with a narrow salmon pink to orange humeral stripe extending along mesopleural suture from collar to halfway or more in mesanepisternum and for about the median half in mesepimeron, a subtriangular yellow patch covering part of dorsal half of mesepimeron and metanepisternum and an elongate yellow mark ventral to metathoracic spiracle; mesokatepimeron and metakatepimeron black with yellow posteroventral corner; metepimeron yellow with narrow black patch in anterodorsal quarter adjacent to the black portion of metanepisternum; subalar ridges largely black; coxae yellow with irregular brownish basal markings on outer surface, all other leg segments black; post-coxae dull yellow; poststernum largely brownish black with some yellow; terga black and yellow.

Wings (Fig. 154). — Venation brown to black; membrane hyaline; humeral plate of forewing brownish grey to blackish brown with a little yellow, of hindwing largely yellow anteriorly, dark brown posteriorly, intermediary piece dark brown in both wings, axillary plate dark brown and yellow in both wings; 16-23/14-20 postnodals; pterostigma greyish brown to blackish brown, overlying $1\frac{1}{2}$ - $2\frac{1}{2}$ cells, 1.3-1.8 mm long in both wings; 5-7/4-5 crossveins between subnodus and origin of R3; generally 3 postdiscoidal cells; anal field generally with two rows of cells for much of its length and single cells for a longer distance proximally, for a shorter distance distally, rarely (in very small specimens) with one row of cells only, never triple cells.

Abdomen. — Tergite 1 metallic black with dull yellow posterior edge and anteroventral corner; tergite 2 metallic black with dull yellow patch along ventral margin; tergites 3-7 metallic black, each with a small almond-shaped pale cream-coloured anterolateral mark each side; tergites 8 and 9 metallic black with dull yellow posterior edge; segment 10 metallic black; sternite 1 yellow; secondary genitalia from whitish yellow to black; sternites 3-9 greyish to brownish black; superior anal appendages black, inferiors brown to brownish black.

Glans penis (Figs 34, 35). — Basal sclerite with rounded basal hummock when viewed from lateral aspect; apex of flagellum broad; tongue-shaped and distinctly dilated.

Anal appendages (Figs 36-38, 142). — Superior appendages with median and distal portions of about the same length and markedly longer than basal portion; basal angle rounded and not directed medially; distal portion rather long and moderately thick; ventral spur hardly curving medially, generally reaching well beyond outer edge of distal portion when viewed from dorsal aspect. If the inner edges of the basal portion of the appendages are set parallel, the subapical gap is about twice as wide as the basal gap, and the distance between the appen-

dages is greatest at the end of the median portion. Inferior appendages very short and wide, their shape depending to some extent on the degree of sclerotization of the individual and on the method of preservation.

Pruinescence. — In mature specimens a slight covering of postgenae, ventral and part of lateral portion of cervix and prothorax, parts of ventral portion of synthoracic pleura, coxae, trochanters, femora, poststernum, tergite 1 and sternites 3-9.

FEMALE

Dimensions. — Hindwing 23.8-28.5 mm; abdomen 27.4-31.0 mm.

Head (Fig. 31), cervix and thorax (Fig. 33). — Much as in male.

Wings. — Much as in male.

Abdomen. — Much as in male; yellow patch of tergite 2 larger; sternite 1 yellowish to greyish brown; sternite 2 greyish black; anal appendages black; ovipositor dull yellowish white adjacent to tergite 9, otherwise black.

Pruinescence. — Much as in male; covering additionally lateral edges of tergites 8 and 9 and ventral portion of segment 10, sternites 1 and 2 and apical portion of ovipositor.

AUSTROARGIOLESTES AUREUS (TILLYARD)

Figures 39-48, 144, 155

Argiolestes aureus TILLYARD, 1906: 178.

Austroargiolestes aureus (Tillyard); KENNEDY, 1925: 294.

Primary type. — Lectotype ♂: N. Q[ueensland], Kuranda, XII.[19]04 (R.J. Tillyard) (BMNH) (KIMMINS, 1970). Not seen.

Material examined. — 68 ♂, 76 ♀, from tropical north-eastern Queensland (exclusively rain forest); northern-most locality Cape Tribulation (16°05'S), southern-most locality Paluma (19°00'S); Sep.-Mar.; AM, ANIC, GT, MV.

TILLYARD (1906) described both sexes of *A. aureus* from Kuranda in north-eastern Queensland and illustrated the male anal appendages. The dorsal markings of head, thorax and basal abdominal segments of both sexes and the male anal appendages were figured by Fraser (1960), who also added the localities Tully and Redlynch, both in north-eastern Queensland.

We illustrate the pattern of the head (Figs 39-42) and of the thorax (Figs 43-45), and the wings (Fig. 155) and describe and figure details of the male secondary genitalia and anal appendages.

Different colour forms of female *A. aureus* occur together with only one form of male. Whereas the thoracic pattern of all males studies roughly corresponds with Fig. 43, the available females range in darkness between Figs 44 and 45. It appears that the females are homochromous (similar to the male) when young

and become heterochromous (much darker) as they age.

Glans penis (Figs 46, 47). — Basal sclerite with rounded angle as viewed from lateral aspect. Apex of flagellum strongly and abruptly dilated for a short distance.

Male anal appendages (Figs 48, 144). — Superior appendages with basal and median portions hardly differentiated and basal angle, therefore, hardly or not at all discernible. Basal and median portions together less than 1.5 times as long as distal portion; inner margin of median portion slightly curved proximal to the inconspicuous and widely rounded subapical angle; ventral spur much reduced, very short, not reaching level of outer edge of distal portion. If the appendages are set in such a way that the tips just touch, the median gap is more than twice as wide as their basal distance (at the posterior margin of segment 10), and their distance increases continuously from base to level of subapical gap. Inferior anal appendages truncate, with very wide apical lobe.

AUSTROARGIOLESTES CHRYSOIDES (TILLYARD)

Figures 49-56, 143, 156

Argiolestes chrysoides TILLYARD, 1913b: 237.

Austroargiolestes chrysoides (Tillyard); KENNEDY, 1925: 294.

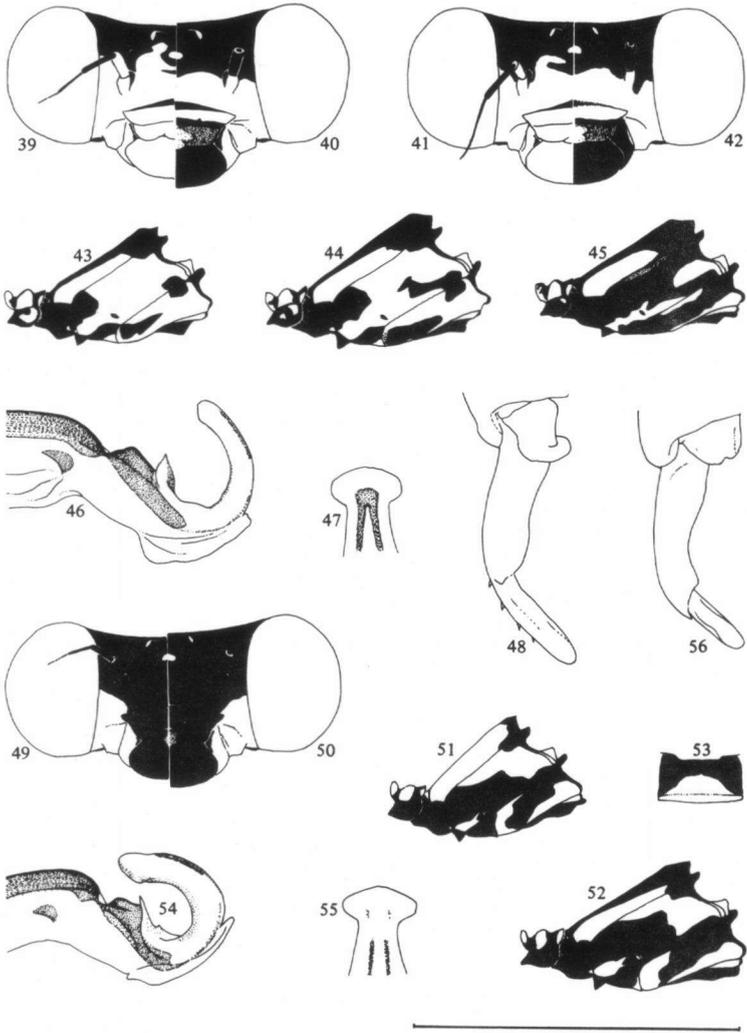
Primary type. — Holotype ♂: Queensland, Blackall Ranges], Montville, 6.X.[19]12 ([A.].J. Turner) (BMNH) (KIMMINS, 1970). Not seen.

Material examined. — 56 ♂, 44 ♀, from south-eastern Queensland (mainly rain forest); northern-most locality Nagoorin (24°22'S), southern-most locality Dawson Creek, near Brisbane (27°22'S); June, Sep.-Feb.; AM, ANIC, GT, MV, QM, UQ.

TILLYARD (1913b) based the description of *A. chrysoides* on a unique male from Montville in south-eastern Queensland; he illustrated the anal appendages. TILLYARD (1917a) described the female, described and illustrated dorsal markings of head, thorax and basal abdominal segments of both sexes from the type locality and pointed out the remarkable changes in coloration from emergence to maturity. FRASER (1960) gave diagnostic characters and re-illustrated them. He also added several localities, all in south-eastern Queensland.

In this paper, we illustrate the pattern of the head (Figs 49, 50), of the thorax (Figs 51, 52) and of the abdomen (Fig. 53), and the wings (Fig. 156), comment on the colour pattern of the female, and describe and figure details of the male secondary genitalia and anal appendages.

Two of the available females show the dark stripe along the dorsal carina only very faintly. Their thoracic colour pattern closely resembles that typical of males (Fig. 51). As both specimens are very teneral, it appears likely that, in females, the darkening on the front of the synthorax is completed later than in other areas. All fully sclerotized females have the black stripe along the dorsal carina and, although we have no intermediates, it is unlikely that there are two forms of



Figs 39-48. *Austroargiolestes aureus* (Tillyard): (39-42) Head, frontal: 39-40, from Paluma, Mount Spec: 39, male; 40, female; 41-42, from Mossman Gorge: 41, male; 42, female; — (43-45) Thorax, lateral: 43, male; 44, pale (? young) female; 45, dark (? old) female; — (46-47) Glans penis: 46, lateral; 47, tip, ventral; — (48) Male, right anal appendages, ventral.
 Figs 49-56. *Austroargiolestes chrysoides* (Tillyard): (49-50) Head, frontal: 49, male; 50, female; — (51-52) Thorax, lateral: 51, male; 52, female; — (53) Female, tergite 1; — (54-55) Glans penis: 54, lateral; 55, tip, ventral; — (56) Male, right anal appendages, ventral. — [Scale line: 1.00 mm for Figs 43-45, 51, 52; 5.00 mm for Figs 39-42, 49, 50, 53; 2.50 mm for Figs 48, 56; 1.25 mm for Fig 46, 47, 54, 55].

mature female in *A. chrysoides*.

Glans penis (Figs 54, 55). Basal sclerite with rounded angle as viewed from lateral aspect. Apex of flagellum widely and abruptly dilated for a short distance.

Male anal appendages (Figs 56, 143). Superior appendages with basal and median portions hardly differentiated and basal angle, therefore, hardly or not discernible. Basal and median portions together at least 1.5 times as long as distal portion; inner margin of median portion strongly curved immediately proximal to the conspicuous but rounded subapical angle; ventral spur well developed, curving medially but reaching beyond outer margin of distal portion when viewed from dorsal aspect. If the appendages are set in such a way that the tips just touch, the subapical gap is less than twice as wide as their basal distance (at the posterior dorsal margin of segment 10), and their distance a little proximal to the subapical gap is greater than the width of the subapical gap. Inferior appendages subtriangular with rounded apical lobe not reaching as far medially as remaining portion.

AUSTROARGIOLESTES AMABILIS (FÖRSTER)

Figures 57-66, 145, 157

Argiolestes amabilis FÖRSTER, 1899: 71.

Austroargiolestes amabilis (Förster); KENNEDY, 1925: 294.

Primary type. — Holotype ♀: Australia, New South Wales, 1898, O. Staudinger (ZMAA). Not seen.

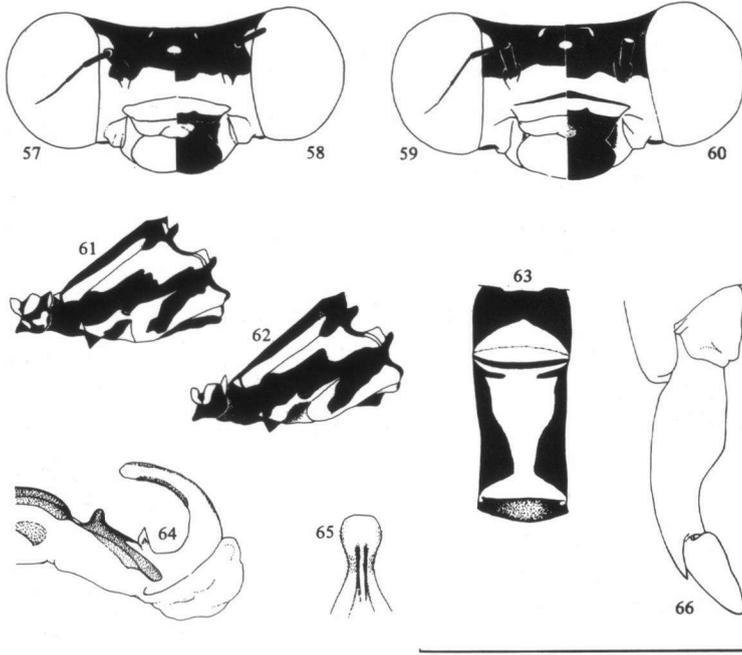
Material examined. — 27 ♂, 66 ♀, from south-eastern Queensland and north-eastern New South Wales (mainly rain forest); northern-most locality Tamborine (27°53'S), southern-most locality Barrington Tops (32°02'S); Aug., Oct.-Feb.; AM, ANIC, GT, MV, QM, UQ.

FÖRSTER (1899) based *A. amabilis* on a unique female from New South Wales (no further data given). TILLYARD (1913a) described the male, presented illustrations of the male anal appendages and redescribed the female on the basis of material from Dorrigo in north-eastern New South Wales. The changes in coloration from emergence to maturity were described and the dorsal markings of head, thorax and basal abdominal segments of both sexes were figured by TILLYARD (1917a). FRASER (1960) gave diagnostic characters and copied the available illustrations.

We present illustrations of the pattern of the head (Figs 57-60), of the thorax (Figs 61, 62) and of the abdomen base (Fig. 63), figure the wings (Fig. 157) and describe and illustrate details of the male secondary genitalia and anal appendages.

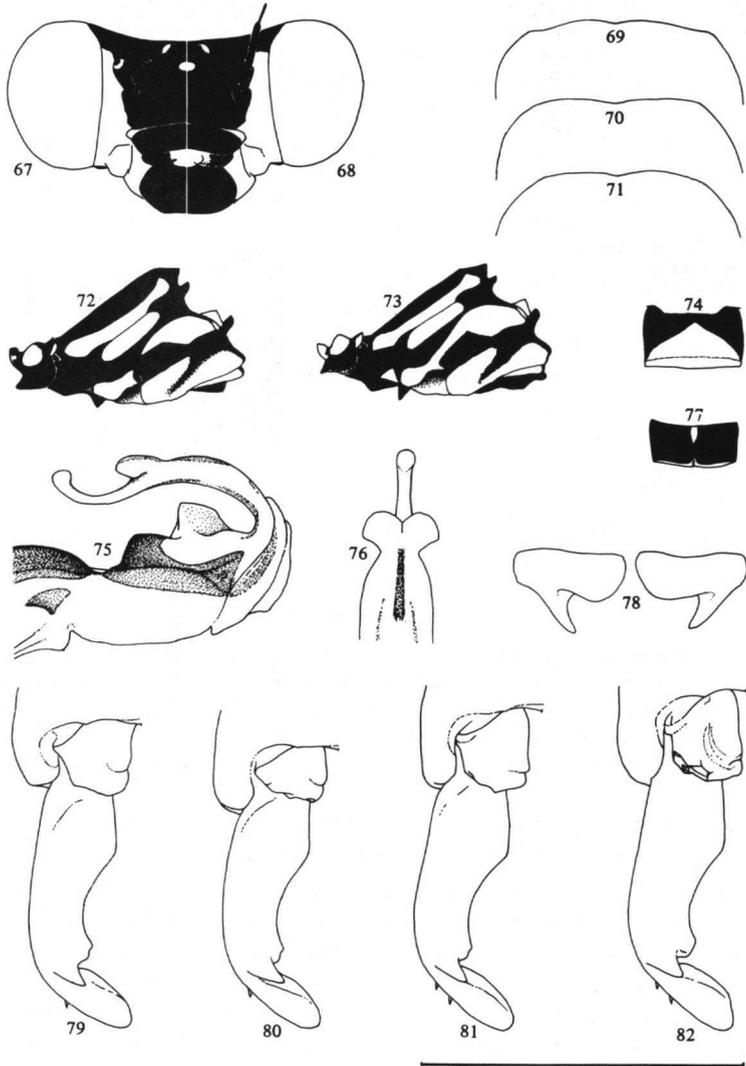
Glans penis (Figs 64, 65). — Basal sclerite with conspicuous backwardly and upwardly directed obtuse cone near base. Apex of flagellum simple, tongue-shaped, slightly dilated and obtuse apically, spiny.

Anal appendages (Figs 66, 145). — Superior appendages with basal, median and distal portions of about the same length; basal angle widely rounded; inner



*Figs 57-66. *Austroargiolestes amabilis* (Förster): (57-60) Head, frontal: 57, 58: from Gloucester River, N.S.W.: 57, male; 58 female; 59-60: from Mount Tamborine, Qld: 59, male; 60 female; — (61-62) Thorax, lateral: 61, male; 62, female; — (63) Female, tergites I and 2; — (64-65) Glans penis: 64, lateral; 65, tip, ventral; — (66) Male, right anal appendages, ventral. — [Scale line: 11.00 mm for Figs 61, 62; 5.00 mm for Figs 57-60, 63; 2.50 mm for Fig. 66; 1.25 mm for Figs 64, 65].

margin of median portion widely and evenly curved (concave) throughout; median angle prominent and rather sharp; distal portion very wide at base, even wider than median portion at subapical angle; ventral spur longer than depth of distal portion and almost perpendicular to the remainder of the appendages and therefore not visible when these are viewed from dorsal aspect. If the inner edges of the basal portion of both appendages are set parallel, the subapical gap is about 1.5 times as wide as the basal gap, and the distance between the appendages proximal to the subapical gap is greater than the width of the subapical gap. Inferior appendages very short, basally wider than distally, with rounded apical lobe.



Figs 67-82. *Austroargiolestes alpinus* (Tillyard): (67-68) Head, frontal: 67, male; 68, female; — (69-71) Posterior lobe of female pronotum, outline, frontal, 3 different specimens; — (72-73) Thorax, lateral: 72, male; 73, female; — (74) Female, tergite I; — (75-76) Glans penis: 75, lateral; 76, tip, ventral; — (77) Female, tergite 10; — (78) Male, superior anal appendages, caudal; — (79-82) Male, right anal appendages, ventral, 4 different specimens. — [Scale line: 11.00 mm for Figs 72, 73; 5.00 mm for Figs 67, 68, 74, 77; 2.50 mm for Figs 69-71, 78-82; 1.25 mm for Figs 75, 76].

AUSTROARGIOLESTES ALPINUS (TILLYARD)

Figures 67-82, 146, 158

Argiolestes alpinus TILLYARD, 1913a: 417.

Austroargiolestes alpinus (Tillyard); KENNEDY, 1925: 294.

Primary type. — Lectotype ♂: N[ew] S[outh] W[ales], Ebor, (4600-4800 ft), 3.I.[19]12 (R.J. Tillyard) (BMNH) (KIMMINS, 1970). Not seen.

Material examined. — 17 ♂, 7 ♀, including paralectotypes, from north-eastern New South Wales (open forest in high country), Ebor and close surroundings (30° 24'S) and New England National Park (30° 30'S); Nov., Jan., Feb.; AM, ANIC, QM.

TILLYARD (1913a) described both sexes of *A. alpinus* from Ebor in north-eastern New South Wales and illustrated the male anal appendages. FRASER (1960) added another locality, Tubrabucca Creek, Barrington Tops. He also figured the dorsal markings of head, thorax and basal abdominal segments and the male anal appendages. Unfortunately, at least the anal appendages seem — although not very accurately — to have been drawn from material collected at Barrington Tops, which we consider to belong to a new species, *A. brookhousei*, described below.

We give illustrations of the pattern of the head (Figs 67, 68), of the thorax (Figs 72, 73), of tergite 1 and segment 10 of the female (Figs 74, 77), figure the outlines of the posterior lobe of the pronotum of the female (Figs 69-71) and the wings (Fig. 158), and describe and depict details of the male secondary genitalia and anal appendages.

Glans penis (Figs 75, 76). — Basal sclerite with rounded angle as viewed from lateral aspect. Flagellum wing-like, dilated subapically and with evenly arched narrow club-shaped median process.

Male anal appendages (Figs 78-82, 146). — Superior appendages with median and distal portions of about the same length and more than 1.5 times as long as basal portion; basal angle inconspicuous, very obtuse and generally widely rounded; inner margin of median portion widely rounded and evenly curved (concave) throughout; subapical angle appears composed of two blunt spurs; distal portion hardly deeper dorsoventrally than the length of ventral spur, which curves medially well proximal to the outer edge of distal portion. If the inner edges of the basal portion of the appendages are set parallel, the subapical gap is about 1.7 times as wide as the basal gap, and the tips do not touch. Inferior appendages very short, truncate, not much narrower distally than basally; shape to some extent depending on degree of sclerotization of individual and on method of preservation.

AUSTROARGIOLESTES BROOKHOUSEI SP. N.

Figures 83-98, 147, 159

Argiolestes alpinus Tillyard; FRASER, 1960: 21 (in part).

Material examined. — **Holotype** ♂ (Type No. 9898): New South Wales, Barrington Tops, Tubrabucca, 8.I.1956, R. Dobson (ANIC). — **Paratypes**: New South Wales: 6 ♂, 4 ♀, same locality as holotype, 8-11.I.1956, R. Dobson (ANIC, MV); 1 ♂, Barrington Tops, 20.I.1927, T.G. Campell (AM); 5 ♂, 2 ♀, Barrington Tops, 7-8.XII.1981, G. Theischinger and L. Müller (GT); 1 ♂, Barrington Tops, 5000 ft (= 1575 m), 16-18.I.1943, A. Musgrave (AM); 1 ♂, Barrington Tops, Big Hole, 27.XI.1979, G. Theischinger and L. Müller (ANIC); 1 ♀, Dorrigo Road, 25.XI.1975, c.u. (ANIC); 1 ♂, 1 ♀, The Flags, 30-33 miles (= 48.3-53.1 km) S of Walcha, 25.I.1963, A. O'Farrell (ANIC); 1 ♂, Gloucester Tops, Gloucester Road, 1.XII.1976, P. Brookhouse (ANIC); 1 ♂, 1 ♀, Gloucester Tops, 11.XII.1979, P. Brookhouse (ANIC); 1 ♂, Gloucester Tops (1350 m), 2.XII.1976, P. Brookhouse (ANIC); 1 ♂, 1 ♀, upper Manning River, 4200 ft (= 1323 m), 16.I.1948, A. Musgrave and Aust. Mus. party (AM); 1 ♂, 1 ♀, McLeods Creek, near Walcha, 6.I.1977, P. Brookhouse (ANIC); 1 ♀, Nulla Creek, near Walcha, 1200 m, 5.I.1977, P. Brookhouse (ANIC); 1 ♂, Wattle Flat, Styx River (30° 33'S, 152° 15'E), 12.XII.1962, A.F. O'Farrell (ANIC).

FRASER (1960), under *A. alpinus*, mentioned material from Ebor and from Barrington Tops. Although all material known to us from Ebor is homogeneous and identical with the paralectotypes of *A. alpinus*, the individuals from Barrington Tops are apparently of a distinct species, which has also been collected on Gloucester Tops, near Walcha, and at Wattle Flat on the Styx River, not far from Ebor. FRASER (1960) has most probably — although not very accurately — figured the male anal appendages of the new species, *A. brookhousei*, under *A. alpinus*.

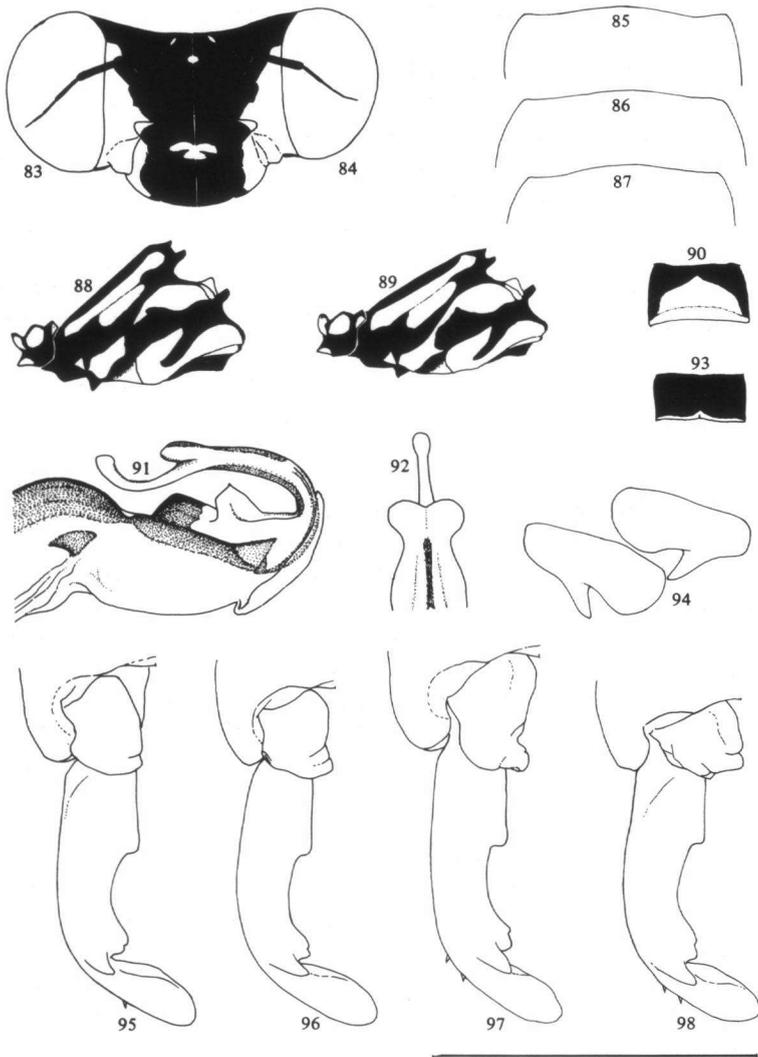
Name. — The species is dedicated to Mr P. BROOKHOUSE who was much involved in collecting material for this study.

MALE

Dimensions. — Hindwing 29.0-31.0 mm; abdomen including anal appendages 35.5-37.5 mm.

Head (Fig. 83). — Labium yellow, labial palps black; genae and base of mandibles yellow; median portion of mandibles black, apical portion blackish red; labrum black with green metallic reflections; anteclypeus medially yellow, laterally brownish to greyish black; postclypeus, vertex, occiput, postocular lobes and postgenae black; frons black with faint rust-coloured mark each side of vertex between the lateral ocellus and the antenna; antennae black, a yellowish brown ring around the apex of scape.

Cervix and prothorax (Fig. 88). — Eucervicale largely greyish brown to brownish black, dorsal and anterior portion dull yellow; postcervicale blackish brown. Pronotum black with lateral third of anterior lobe, large oval lateral patch on median lobe and lateral portion of posterior lobe yellow; posterior lobe subrectangular in shape, the corners only slightly rounded (much as in Figs 85-87); epimeron black; episternum black with subtriangular yellow patch adjacent to



Figs 83-98. *Austroargiolestes brookhousei* sp. n.: (83-84) Head, frontal: 83, male; 84, female; — (85-87) Posterior lobe of female pronotum, outline, frontal, 3 different specimens; — (88-89) Thorax, lateral: 88, male; 89, female; — (90) Female, tergite I; — (91-92) Glans penis: 91, lateral; 92, tip, ventral; — (93) Female, tergite 10; — (94) Male, superior anal appendages, caudal; — (95-98) Male, right anal appendages, ventral: 95, from Barrington Tops; 96, from Gloucester Tops; 97, from Walcha; 98, from Wattle Flat. — [Scale line: 11.00 mm for Figs 88, 89; 5.00 mm for Figs 83, 84, 90, 93; 2.50 mm for Figs 85-87, 94-98; 1.25 mm for Figs 91, 92].

coxa; coxa dull yellow with ill-defined brownish black mark of irregular shape on outer surface; trochanter, femur, tibia including spines and comb, tarsus and claws black.

Synthorax (Fig. 88). — Mesostigmatic lamina, spiracular dorsum, collar, dorsal carina, antealar ridge and sinus bronze-black; mesanepisternum, mesepimeron and metanepisternum bronze-black with broad greyish yellow humeral stripe almost parallel-sided from collar to about $3/4$ length of mesopleural suture, thence strongly constricted and widening again, slightly arching towards dorsal carina along antealar ridge; greyish yellow posthumeral stripe covering about median half of anterior portion of mesepimeron and very narrowly separated from humeral stripe by, sometimes, interrupted black line along mesopleural suture, large brownish yellow dorsolateral mark, and separated from it, elongate dull yellow ventrolateral mark; metepimeron yellow with bronze-black bar directed posteroventrally and broadly connected with black portion of metanepisternum; mesokatepisternum bronze-black with yellow posteroventral corner; metakatepisternum greyish brown anteriorly, dull yellow posteriorly; subalar ridges largely black; coxae yellow with brown to black mark of irregular shape on outer surface; trochanters, tibiae, tarsi and claws black; postcoxae and poststernum dull yellow; terga dull yellow to greyish brown.

It should be mentioned that the pale markings on the thorax are vivid blue in live adults.

Wings (Fig. 159). — Venation brown to black; membrane hyaline; humeral plate largely greyish yellow anteriorly, black posteriorly, intermediary piece greyish to blackish brown, and axillary plate brown in both wings; postnodals 18-21/18-21; pterostigma blackish brown, overlying $1\frac{1}{2}$ -3 cells (generally 2), 1.4-1.6 mm long in forewing, 1.4-1.7 mm in hindwing; 7/4-5 crossveins between subnodus and origin of R₃; generally 3, rarely 4 postdiscoidal cells; at least 3, sometimes 4 rows of cells for about half length of anal field.

Abdomen. — Tergite 1 brownish grey with dull yellow, wide and short subtriangular posteromedian mark, including posterior edge, and whitish grey ventral edge; tergite 2 bronze-black with yellowish grey patch along ventral edge; tergites 3-6 bronze-black, each with a small yellow almond-shaped anterolateral mark each side; tergite 7 as tergites 3-6 but in addition with posterior edge dorsally and lateroventrally yellow; tergites 8 and 9 bronze-black with posterior edge dorsally and lateroventrally yellow; segment 10 black; sternite 1 yellowish brown; secondary genitalia from greyish white to black; sternites 3-9 greyish black with some yellowish to reddish brown along posterior edge; superior anal appendages black, inferiors brownish black and yellow.

Glans penis (Figs 91, 92). — Basal sclerite with rounded angle when viewed from lateral aspect; flagellum wing-like, dilated subapically and with evenly arched, narrow, club-shaped apex.

Anal appendages (Figs 94-98, 147). — Superior appendages with median

and distal portions of about the same length and less than 1.5 times as long as basal portion; basal angle conspicuous, not very obtuse; inner margin of median portion not evenly curved throughout; subapical angle appears composed of two blunt spurs; distal portion considerably deeper dorsoventrally than the length of the ventral spur which curves medially well proximal to outer edge of distal portion. If the inner edges of the basal portion of the appendages are set parallel, the subapical gap is about 1.2 times as wide as the basal gap, and the tips overlap considerably. Inferior appendages very short, truncate, not much narrower distally than basally, their shape dependent to some extent on degree of sclerotization of the individual and on the method of preservation.

Pruinescence. — Not strong; in mature specimens generally covering postgenae, sides of pronotum, sides of synthorax, particularly near metapleural suture, thoracic sterna and terga, coxae, trochanters and femora, wing bases, and abdominal segment 1 and sternites 3-9.

FEMALE

Dimensions. — Hindwing 28.0-29.5 mm; abdomen 32.0-34.0 mm.

Head (Fig. 84), cervix and thorax (Figs 85-87, 89). — Much as in male.

Wings. — Much as in male; postnodals 17-19/16-18; pterostigma pale greyish to brownish yellow, 1.5-1.8 mm long in both wings; 6-8/5 crossveins between subnodus and origin of R₃; 3-4 postdiscoidal cells.

Abdomen. — Much as in male; sternite 8 with posterolateral yellow mark; ovipositor largely blackish to reddish brown, dull yellow adjacent to ventral edge of tergite 9; anal appendages black.

Pruinescence apparently less strongly developed than in male except on abdominal sternites; also covering ovipositor.

AUSTROARGIOLESTES ICTEROMELAS (SELYS)

Figures 99-138, 148-150, 160-162

Argiolestes icteromelas SELYS, 1862: 38.

Argiolestes icteromelas nobilis TILLYARD, 1913a: 410.

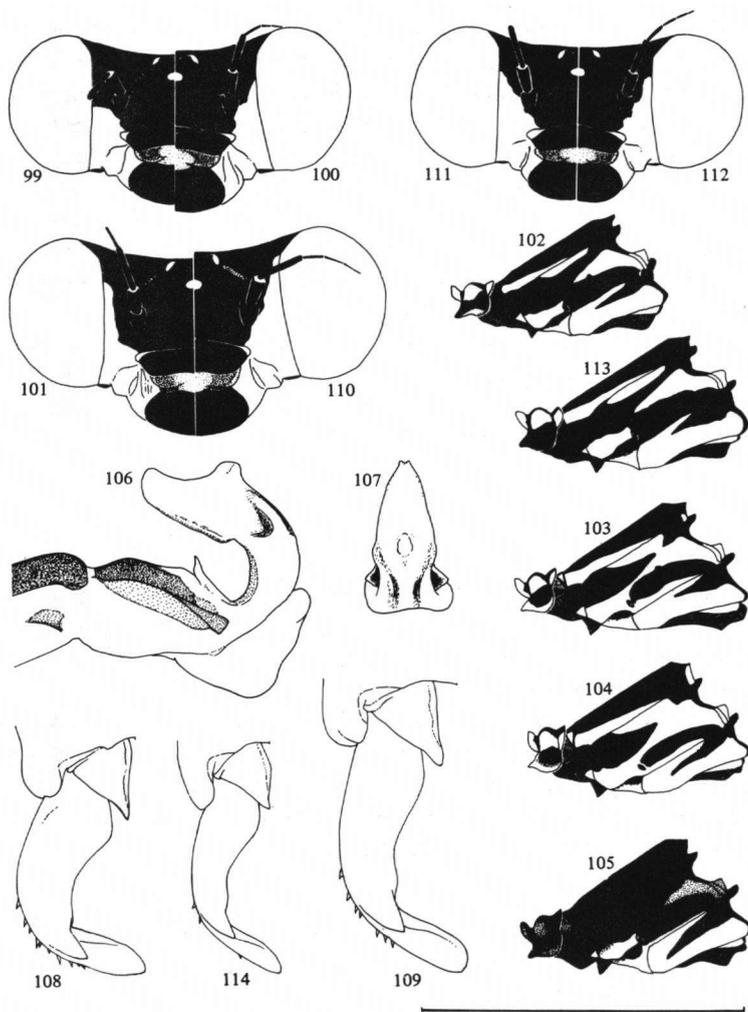
Austroargiolestes icteromelas (Selys); KENNEDY, 1925: 294.

Risiolestes icteromelas (Selys); FRASER, 1926: 486.

Argiolestes calcaris tenuis FRASER 1959: 360, syn. nov.

Primary types. — Lectotype ♂ of *A. icteromelas* (by present designation): Melbourne, no other clearly legible data (IRNB). Seen. Lectotype ♂ of *A. icteromelas nobilis*: N[ew] S[outh] W[ales], Ebor (4000-5000 ft), 6.1.[19]12 (R.J. Tillyard) (BMNH) (KIMMINS, 1970). Not seen. Lectotype ♂ of *A. calcaris tenuis*: Queensland, Stoney Ck, Byfield, Rockhampton, 16.X.1955, R. Dobson (ANIC Type No. 9846) (WATSON, 1968). Seen.

SELYS (1862) described both sexes of *A. icteromelas* from Melbourne in



Figs 99-114. *Austroargiolestes icteromelas* (Selys): 99-109, *A. i. icteromelas*: (99-101) Head, frontal: 99, 100, from Lorne, Vic.: 99, male; 100 female; 101, male paralectotype of *A. i. nobilis*; — (102-105) thorax lateral: 102, from Royal N.P., N.S.W.; 103, 104, from Barrington Tops, N.S.W.; 105 from Serpentine River, N.S.W.; — (106-107) Glans penis: 106, lateral; 107, tip, ventral; — (108-109) Right male anal appendages: 108, lectotype, from Melbourne; 109, paralectotype of *A. i. nobilis*; — (110-114) *A. icteromelas nigrolabiatius* nom. nov.: 110-112, head, frontal: 110, female, from Carnarvon Gorge, Qld; 111, 112, from McLeod River, Qld; 111, male; 112, female; 113, thorax, lateral, male, from Finch Hatton Gorge, Qld; 114, right male anal appendages, lectotype of *A. calcaris tenuis* (Fraser), from nr Rockhampton, Qld. — [Scale line: 11.00 mm for Figs 102-105, 113; 5.00 mm for Figs 99-101, 110-112; 2.50 mm for Figs 108, 109, 114; 1.25 mm for Figs 106, 107].

Victoria, but did not illustrate them. TILLYARD (1913a) figured the male anal appendages of what he considered to be a distinct "race" from the Dorrigo Plateau and Ebor, and pointed out the great variation in size and markings of *A. icteromelas* from the extreme north (Herberton) to the extreme south of its range. FRASER (1959, 1960) recorded many localities, all in southern Queensland and New South Wales, and figured a wing and the male anal appendages. TILLYARD (1917b) described and illustrated the caudal lamellae of larval *A. icteromelas* and commented on their position and function. LIEFTINCK (1956) thought that Tillyard's diagram showing transverse sections of the gill system had been inverted accidentally but, in 1976, recognized that Tillyard had been right, and gave a full description and illustrations of the larva.

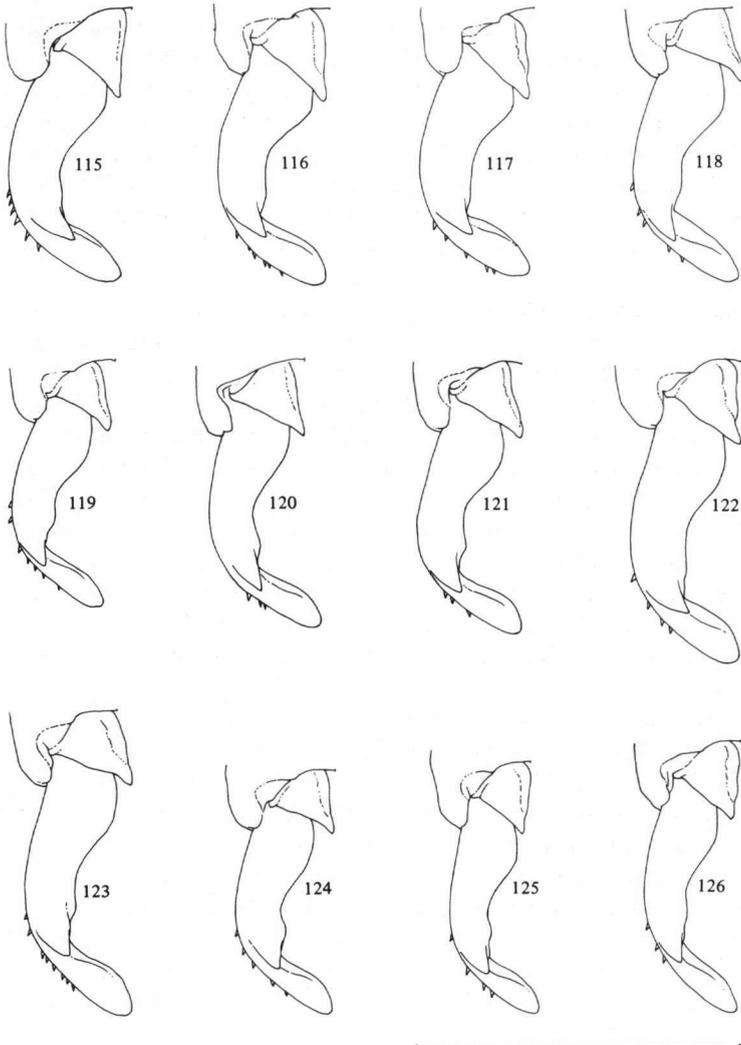
During the studies that led to this paper, we studied large numbers of what we believed to be *Austroargiolestes icteromelas* from tropical Queensland to the south of Victoria and from isolated areas such as Carnarvon Gorge, the Grampians and the Otways. All males studied correspond closely with each other (Figs 115-138, 148-150) and with the males of SELYS' (1862) type series from which we designate a lectotype (cf. below) (Fig. 108), in the secondary genitalia and anal appendages. We have, however, found great variability between populations and individuals, in size, build, pruinescence, colour pattern and venation of the anal field. As we have not been able to discover the coexistence in the same locality of clearly distinct groups of individuals or clear correlations of these variable characters, we define *A. icteromelas* by details of the male secondary genitalia (Figs 106, 107) and the male anal appendages (Figs 108, 109, 114-138, 148-150) (cf. below).

A. icteromelas nobilis (Fig. 109) and *A. calcaris tenuis* do not differ significantly from typical *A. icteromelas* in these characters, and features originally (TILLYARD, 1913a; FRASER, 1959, 1960) used to discriminate these forms (size, robustness, pruinescence, venation) fail to define feasible subspecific units within *A. icteromelas* (cf. below). We therefore follow WATSON (1974) in regarding *A. icteromelas nobilis* and *A. calcaris tenuis* as junior synonyms of *A. icteromelas*. However, we have found that some characters of *A. icteromelas* indicate that what has been known as *A. calcaris tenuis* should be regarded as a distinct subspecies of *A. icteromelas*. As *A. calcaris tenuis* is a primary homonym of *A. griseus tenuis* TILLYARD, 1913a (WATSON, 1968) a new name for *A. calcaris tenuis* is required.

CONSISTENT CHARACTERS OF *A. ICTEROMELAS*

Glans penis (Figs 106, 107). — Basal sclerite with widely rounded basal angle as viewed from lateral aspect. Flagellum short and thick with huge dog-head-shaped apex.

Male anal appendages (Figs 108, 109, 114-138, 148-150). — Superior



Figs 115-126. *Austroargiolestes icteromelas* (Selys), right male anal appendages, ventral: (115-123) *A. i. icteromelas*: 115, from nr Lorne, Vic.; 116, from the Grampians, Vic.; 117, from Mornington Peninsula, Vic.; 118, from Monga, N.S.W.; 119, from Heathcote, N.S.W.; 120, from Barrington Tops, N.S.W.; 121, from Tenterfield, N.S.W.; 122, from Armidale, N.S.W.; 123, from Ben Lomond, N.S.W.; — (124-126) *A. i. nigrolabiatus* nom. nov.: 124, from Brisbane, Qld; 125, from Samford, Qld; 126, from Gympie, Qld. — [Scale line: 2.50 mm].

appendages with median portion longer than distal portion, and distal portion longer than basal portion; basal angle usually very widely rounded; inner margin of medial portion generally widely and more or less evenly curved, occasionally somewhat undulate distally; subapical angle widely rounded; ventral spur curving medially before outer edge of distal portion. If the inner edges of the basal portion of the appendages are set parallel the subapical gap is at least twice as wide as the basal gap, and the tips touch. Inferior appendages short, appearing heavily sclerotized and triangular from ventral aspect.

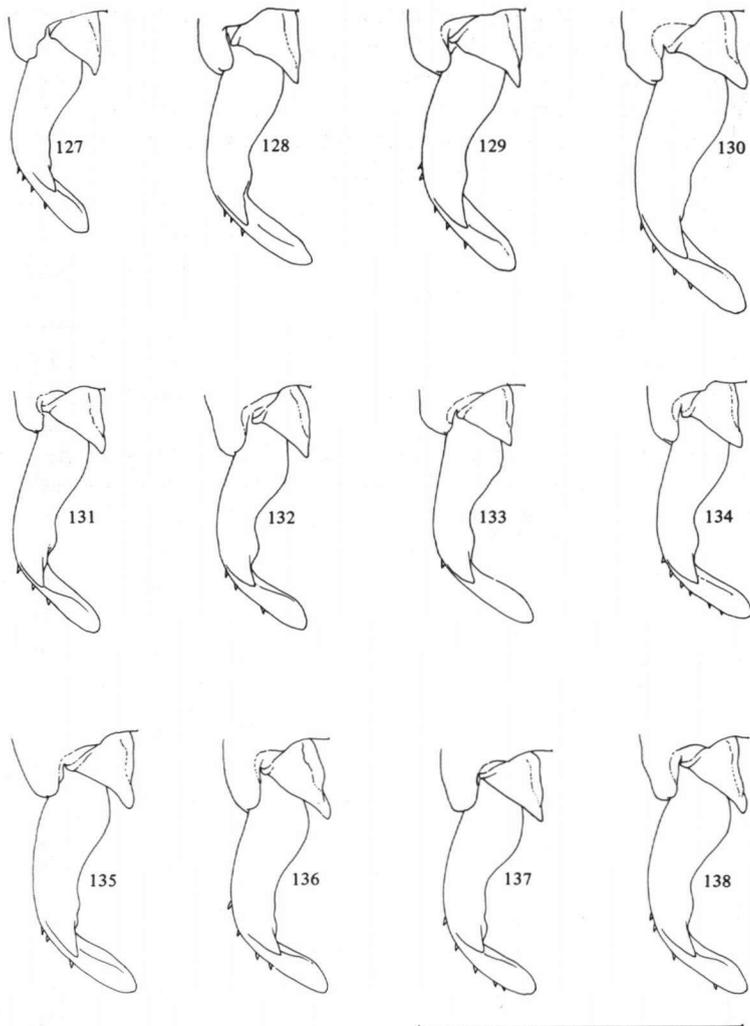
THE SIGNIFICANCE OF CERTAIN CHARACTERS IN *A. ICTEROMELAS*

Size. — Although there is an enormous difference between the measurements of the largest and smallest *A. icteromelas*, individuals of the same population do not usually differ much in size.

In Table I we present information on the dimensions of *A. icteromelas* in populations from a wide geographical range. Six males and six females of each population were measured (if available), otherwise the data are based on all available material.

Table I
Austroargiolestes icteromelas: variation in dimensions in various geographic populations. —
(Up to six specimens of each sex were measured in each population)

Locality (order North-South)	Measurements (length in mm)			
	Male		Female	
	abd.+app.	hw.	abd.	hw.
McLeod River	32.3-35.2	26.5-27.8	30.3-31.5	27.6-29.3
Paluma	33.6-35.2	26.1-29.2	31.1-33.0	27.6-27.8
Yeppoon	32.5-34.1	24.0-26.5		
Rockhampton, Bouldercombe	36.8	28.8	31.5	28.3
Kroombit Tops	36.9-37.5	29.8-31.3		
Bundaberg	33.4-35.1	25.3-26.4	30.0-32.4	26.7-28.5
Carnarvon Gorge	39.6-41.4	32.0-32.9	34.2-36.2	33.3-34.3
Searys Creek	29.0-32.6	22.9-24.2	28.0-29.0	24.2-24.8
Tamborine	32.0-35.8	26.0-28.2	31.5-34.2	27.1-29.5
Fletcher	36.5-37.3	29.0-29.3		30.0
Ebor	37.2-40.5	30.9-31.7	33.2-34.9	29.0-31.5
Armidale	34.7-38.0	28.0-31.3		
Woronora River	31.3-37.6	24.7-29.7	30.4-30.8	27.0-27.4
Cotter River	34.5-35.6	27.9-29.6	29.8-32.0	28.2-30.2
Bolairo, Murrumbidgee River	34.6-36.8	28.1-28.6	30.1-30.9	27.8-28.0
Grampians	34.1-36.6	26.9-29.2	30.5	28.0
Otways	35.0-36.2	29.0-29.6	30.0-32.5	29.0-31.0



Figs 127-138. *Austroargiolestes icteromelas nigrolabiatius* nom. nov.: right male anal appendages, ventral, all from Qld: (127) From nr Rainbow Beach; — (128) Kroombit Tops; — (129) Blackdown Tablelands; — (130) Carnarvon Gorge; — (131) Bluff, Biggenden; — (132) Byfield; — (133) Yeppoon; — (134) Kondalilla Falls; — (135-136) Eungella, 2 different specimens; — (137) McLeod River; — (138) Paluma. — [Scale line: 2.50 mm].

Venation of the anal field. — FRASER (1959, 1960) tried to define specific and infraspecific units within *Argiolestes*, particularly *A. icteromelas*, by the number of cell rows in the anal field. To talk about a certain number of cell rows is

much easier than to discern them. There is no problem as long as the anal field is roughly parallel-sided and made up of one row of cells throughout. However, as soon as there are double cells, triple cells, or, in fact, 2 or 3 rows of cells for some distance, a simple definition of the venational situation in the anal field becomes difficult. As there are always at least some single cells on the proximal side and usually a few on the distal side of the anal field we use, in this paper, the terms "type 1, 2 and 3" for what roughly corresponds with the concept of 1, 2 and 3 rows of cells in the anal field as used by previous authors, and define them as follows:

- type 1: generally 1 row of cells throughout the length of the anal field in most individuals, rarely double, never triple cells (e.g. Fig. 161);
 type 2: generally 2 rows of cells for much of the length of the anal field in most individuals, occasionally single triple cells (e.g. Fig. 162);
 type 3: generally 2 rows of cells for much of the length of the anal field and, additionally, several triple cells or rows of triple cells for some distance in more than 1 wing of most individuals (e.g. Fig. 160).

In table II we give a survey of the venational situation in the anal field of some populations of *A. icteromelas*. The populations are listed in an order determined by their wing size (longest — shortest hindwing). Trends from one type of venation to another show that it is at least as difficult to classify populations according to their venational situations in the anal field as it is to define those situations.

Table II
Austroargiolestes icteromelas: venation in the anal field in different populations,
 which are listed in order of decreasing hind wing length

Locality	1	Type 2	3
Carnarvon Gorge, Qld		+ (gen.)	+ (occ.)
Ebor, N.S.W.			+
Kroombit Tops, Qld		+	
Otways, Vic.		+	
Armidale, N.S.W.		+	
Fletcher, Qld.		+ (r.)	+
Cotter River, A.C.T.		+ (gen.)	+ (occ.)
Bolairo, N.S.W.			+
Grampians, Vic.		+	
Rockhampton, Boulder- combe, Qld		+ (gen.)	+ (occ.)
Woronora River, N.S.W.		+	
Mount Tamborine, Qld		+	
Bundaberg, Qld	+	+	
Yeppoon, Qld	+	+ (r.)	
Searys Creek, Qld	+ (gen.)	+ (occ.)	

gen. = generally; occ. = occasionally; r. = rarely

Colour, pattern and pruinescence. — In general, pattern, colour and pruinescence in *A. icteromelas* are difficult to evaluate. Although the range is quite remarkable, those characters depend to a considerable extent on the degree of maturity, possibly age, and the method of preservation of the individuals, so that delimitation of different types is bound to be arbitrary. We have illustrated only several extreme (Figs. 104, 105) and a few more average types (Figs 102, 113) of thoracic pattern, but all intergrades between them appear to be possible, and many have been found. Although individuals of a given population are generally more similar to each other than to individuals of other populations, we did not find the magnitude of differences between different populations to be related to their geographical distance or to the altitude of localities.

One character, however, the colour of the labium [which is either very dark brown to black or very pale (yellowish)], makes it easy to separate two groups within *A. icteromelas*. As each group occupies a distinct geographical area, contiguous with that of the other, and as there are areas in between where individuals of both groups have been found, even in copula, we split *A. icteromelas* into two subspecies, as follows.

AUSTROARGIOLESTES I. ICTEROMELAS (SELYS)

Figures 99-109, 115-123, 148, 160

Argiolestes icteromelas SELYS, 1862: 38.

Argiolestes icteromelas nobilis TILLYARD, 1913a: 410, syn. nov.

Austroargiolestes icteromelas (Selys); KENNEDY, 1925: 294.

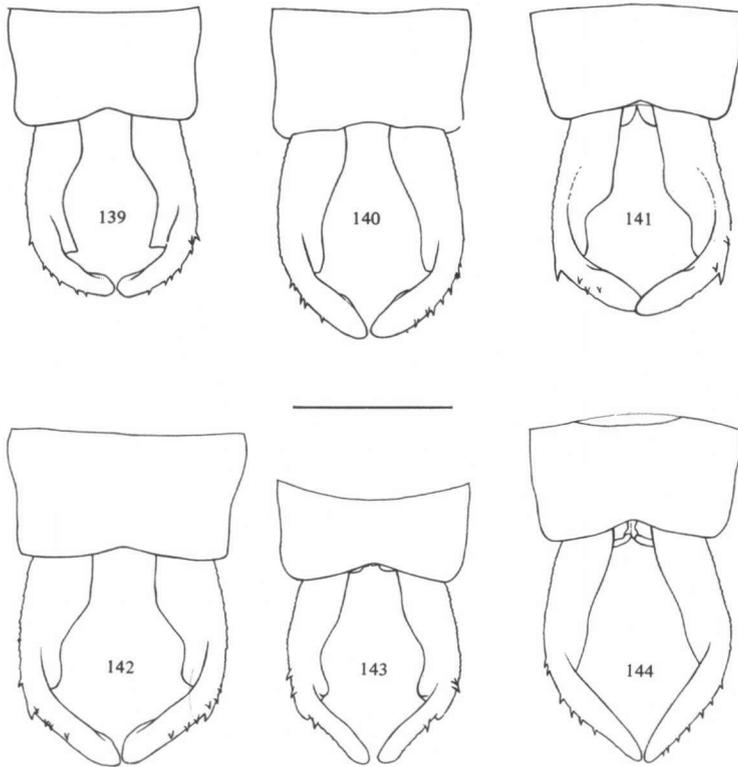
Primary types. — Lectotype ♂ of *A. icteromelas* (by present designation): Melbourne, no other clearly legible data (IRNB). Seen. Lectotype ♂ of *A. icteromelas nobilis*: N[ew] S[outh] W[ales], Ebor (4000-5000 ft), 6.I. [19]12 (R.J. Tillyard) (BMNH) (KIMMINS, 1970). Not seen.

Material examined. 644 ♂, 372 ♀, including paralectotypes of *A. icteromelas* and of *A. i. nobilis*, from south-eastern Queensland, eastern New South Wales and Victoria (low to high altitude country, mainly open forest); northern-most locality Tallebudgera (28°08'S), southern-most locality Glenaire 38°47'S); Jan.-Dec.; AM, ANIC, GT, IRNB, MV, UQ.

The diagnostic character of typical *A. icteromelas* (now including *A. i. nobilis*) is a very pale, mostly yellowish, labium.

Populations of *A. i. icteromelas* are — as discussed above (under *A. icteromelas*) — otherwise variable in colour, pattern, pruinescence, size and venation of the anal field.

A. i. icteromelas ranges from southern Victoria through New South Wales and, mainly along the Granite Belt (Dalveen, Fletcher, Glen Aplin) into south-eastern Queensland. Mixed populations (*A. i. icteromelas* and *A. i. nigrolabiatus* nom. nov.) occur particularly along the coast, on the eastern slopes of the Dividing Range and in lower altitude areas in eastern New South Wales. The northern-most locality on record for *A. i. icteromelas* is Tallebudgera (28°08'S)



Figs 139-144. Male anal appendages, dorsal, of *Austroargiolestes* species: (139) *A. calcaris* (Fraser); — (140) *A. christine* sp. n.; — (141) *A. elke* sp. n.; — (142) *A. isabellae* sp. n.; — (143) *A. chrysoides* (Tillyard); — (144) *A. aureus* (Tillyard). — [Scale line: 1.25 mm].

in Queensland, the southern-most locality recorded for *A. i. nigrolabiatus* is near Monga (35° 35'S) in New South Wales.

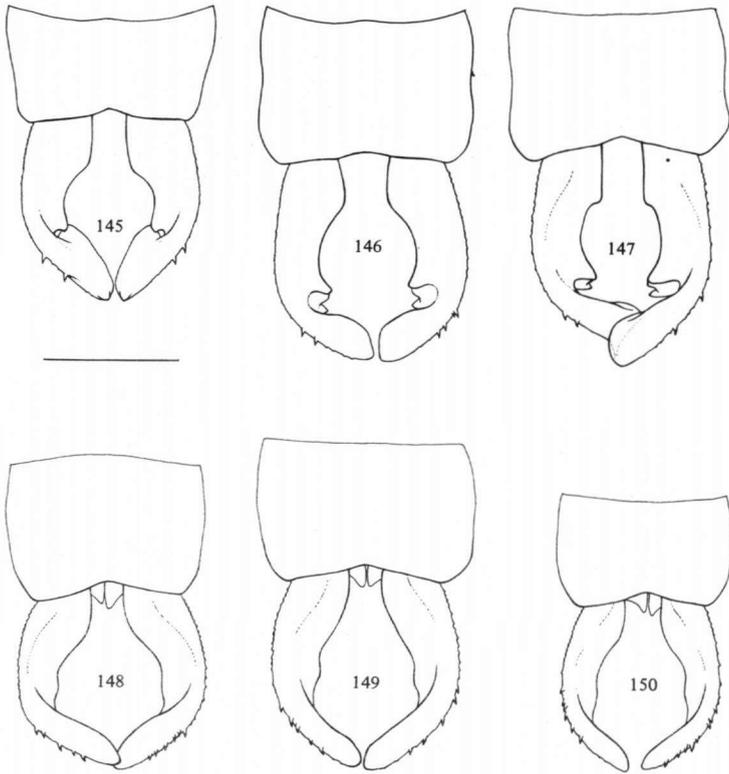
***AUSTROARGIOLESTES I. NIGROLABIATUS* NOM. NOV.**

Figures 110-114, 124-138, 149, 150, 161, 162

Argiolestes calcaris tenuis FRASER, 1959: 360 (primary homonym of *A. griseus tenuis* TILLYARD, 1913a: 413-4).

Primary type. — Holotype ♂: Queensland, Stoney Ck, Byfield, Rockhampton, 16.X.1955, R. Dobson (ANIC Type No. 9846 [=Lectotype of *A. calcaris tenuis* Fraser (WATSON, 1968)]).

Material examined. — 442 ♂, 170 ♀, including paralectotypes of *A. calcaris tenuis*, from eastern and southern inland Queensland and eastern New South Wales (low to high altitude country, more or less open forest and rainforest); northern-most locality McLeod River (16° 27'S), southern-most



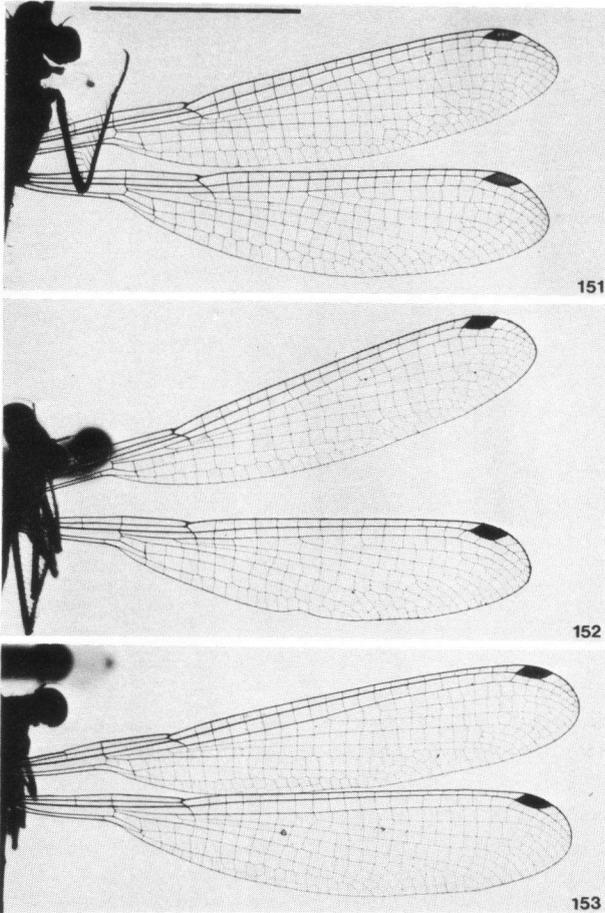
Figs 145-150. Male anal appendages, dorsal, of *Austroargiolestes* species: (145) *A. amabilis* (Förster); — (146) *A. alpinus* (Tillyard); — (147) *A. brookhousei* sp. n.; — (148-150) *A. icteromelas* (Selys): 148, *A. i. icteromelas*, from Mornington Peninsula; 149-150, *A. i. nigrolabiatus* nom. nov.: 149, from Carnarvon Gorge; 150, from McLeod River, Qld. — [Scale line: 1.25 mm].

locality Monga (35°35'S); Jan.-Dec.; AM, ANIC, GT, IRNB, MV, QM, UQ.

Name. — The new name of this subspecies of *A. icteromelas* is based on the colour of its labium.

The diagnostic character of *A. i. nigrolabiatus* is a very dark, mostly black, labium. Like typical *A. icteromelas*, *A. i. nigrolabiatus* otherwise displays marked geographical variability in colour, pattern, pruinescence, size and venation of the anal field (cf. above under *A. icteromelas*).

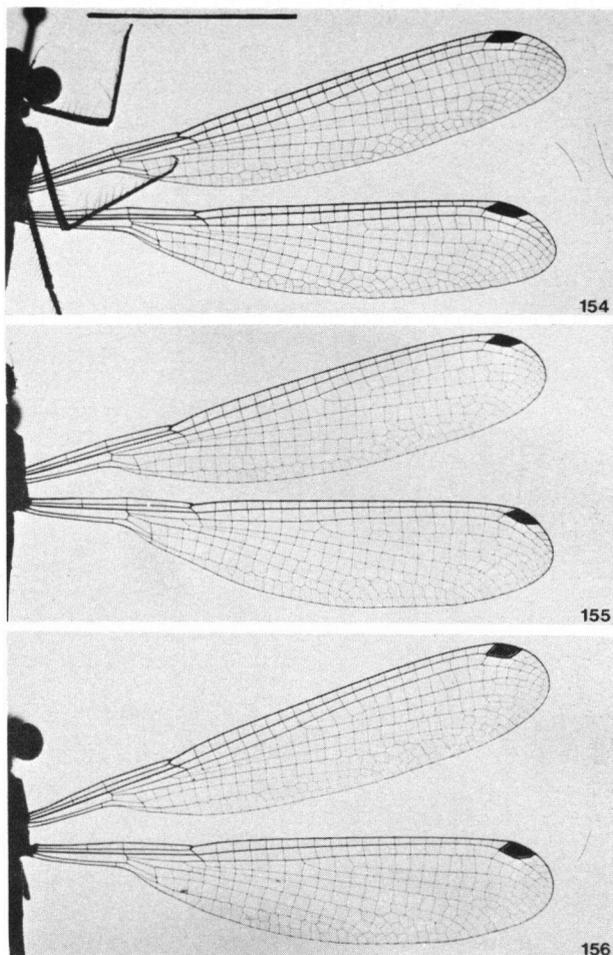
A. i. nigrolabiatus apparently includes almost all Queensland populations except those from the Granite Belt (Dalveen, Fletcher, Glen Aplin). It extends into New South Wales particularly along the coast, on the eastern slopes of the Dividing Range and in lower altitude areas. Mixed populations of *A. i. nigrolabiatus* and *A. i. icteromelas* are known from Tallebudgera (28°08'S) in Queensland to near Monga (35°35'S) in New South Wales.



Figs 151-153. *Austroargiolestes* species, right wings: (151) *A. calcaris* (Fraser), female; — (152) *A. christine* sp. n., male; — (153) *A. elke* sp. n., male. — [Scale line: 10.00 mm].

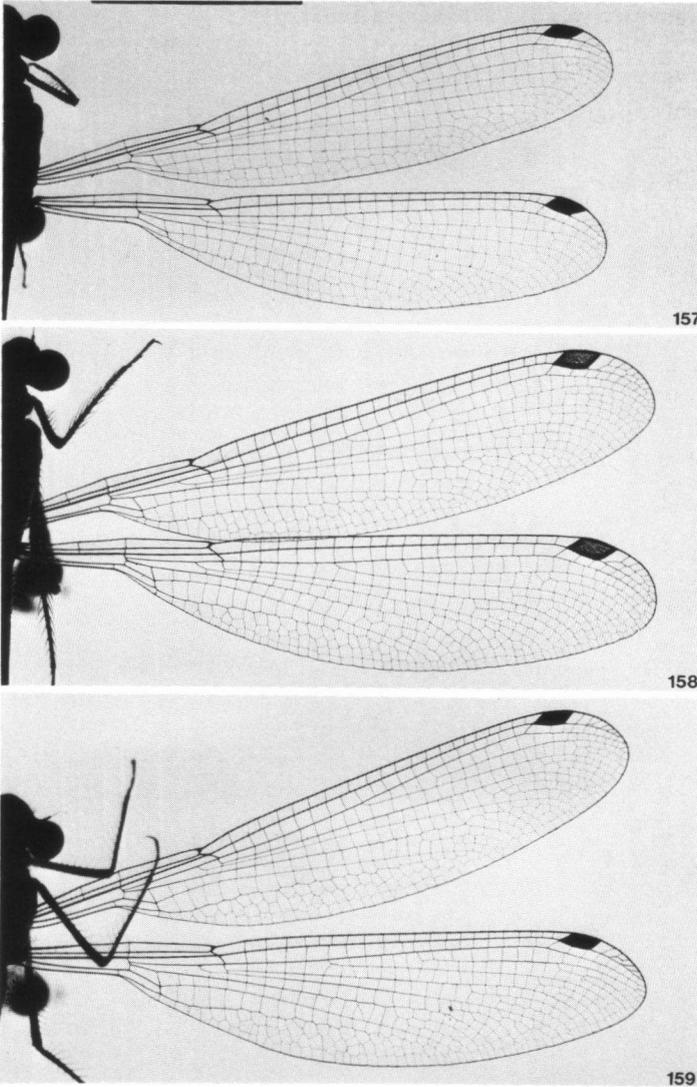
KEY TO THE SPECIES OF *AUSTROARGIOLESTES*

- 1 Anterior frons and postclypeus largely pale, yellowish or reddish orange2
- Anterior frons, clypeus and labrum dark greenish brown to black3
- 2(1) Tergite 2 black with conspicuous white to orange dorsal mark, shaped like a thick-stemmed wine glass *amabilis*
- Tergite 2 black without any conspicuous bright dorsal mark *aureus*
- 3(1) MALE4
- FEMALE12
- 4(3) Front of synthorax almost completely pale, yellow to orange, not pruinose *chrysoides*



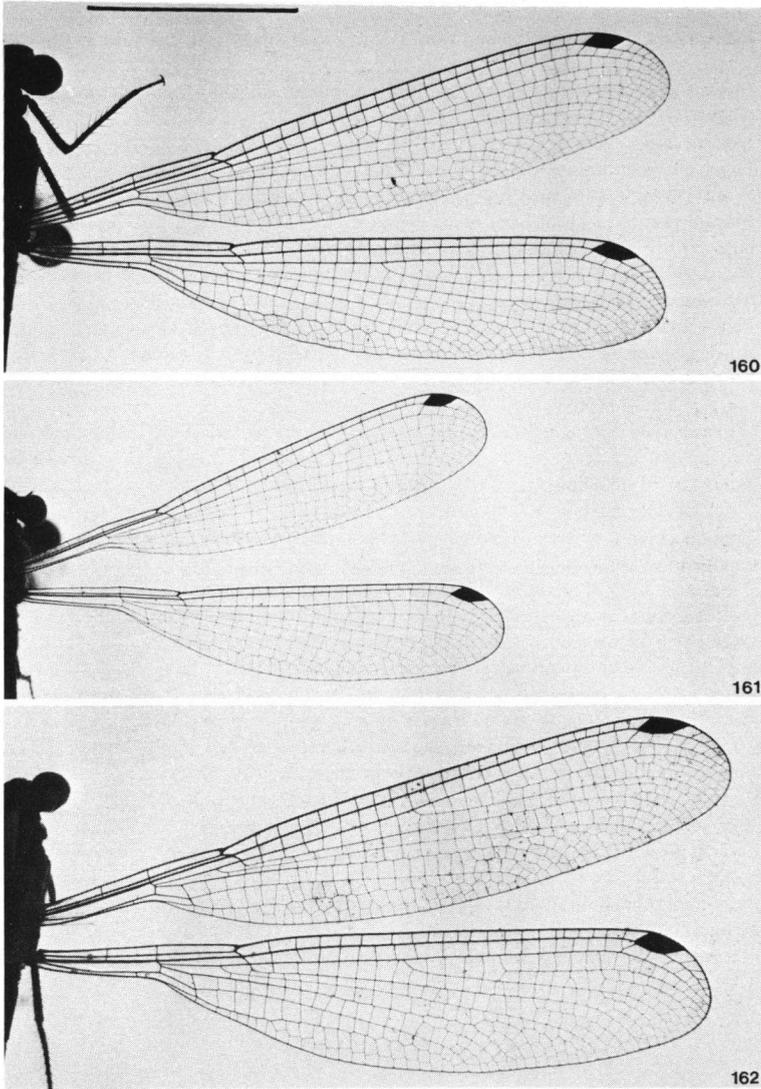
Figs 154-156. *Austroargiolestes* species, right wings: (154) *A. isabellae* sp. n., male; — (155) *A. aureus* (Tillyard), male; — (156) *A. chrysoides* (Tillyard), male. — [Scale line: 10.00 mm].

- Median part to much of front of synthorax dark brown to black, with pale to yellowish brown humeral stripe on each side, sometimes pruinosecent5
- 5(4) Humeral stripe constricted near upper end, then broadened at tip6
- Humeral stripe not widened at upper end7
- 6(5) Basal angle of superior anal appendages almost uniformly rounded; tips of appendages not overlapping if inner edges of basal portion are set parallel *alpinus*
- Basal angle of superior anal appendages slightly angulated; tips of appendages overlapping if inner edges of basal portion are set parallel *brookhousei*
- 7(5) Superior anal appendages with tip of ventral spur visible from above8



Figs 157-159. *Austroargiolestes* species, right wings: (157) *A. amabilis* (Förster), male; — (158) *A. alpinus* (Tillyard), female; — (159) *A. brookhousei* sp. n., male. — [Scale line: 10.00 mm].

- Superior anal appendages with ventral spur not visible from above9
- 8(7) Outer face of mandible very dark brown to black, with pale basal patch; superior anal appendages with basal portion about as long as median or distal portion *elke*
- Outer face of mandible largely yellowish white to yellow; superior anal appendages with basal portion markedly shorter than median or distal portion *isabellae*



Figs 160-162. *Austroargiolestes icteromelas* (Selys), right wings: (160) *A. i. icteromelas*, from Ebor (hitherto considered as *A. i. nobilis*); — (161-162) *A. i. nigrolabiatum* nom. nov.: 161, male from Byfield (hitherto considered as *A. calcaris tenuis*); 162, male from Carnarvon Gorge. — [Scale line: 10.00 mm].

- 9(7) Distal end of inner margin of medial portion of superior appendage ending in sharp point, forming acute subapical angle *calcaris*
- Distal end of inner margin of medial portion of superior appendage rounded, or continuing

- into inner ridge of ventral spur 10
- 10(9) Inferior anal appendages, viewed from below, broad, blunt, rounded apically (Figs 18, 19) *christine*
- Inferior anal appendages, viewed from below, almost triangular with sharply pointed tips (Figs 115-138): *icteromelas* 11
- 11(10) Labium largely pale, yellowish white *i. icteromelas*
- Labium largely brownish black *i. nigrolabiatius*
- 12(3) Front of synthorax almost completely pale yellow to white *chrysoides*
- Median part to much of front of synthorax dark brown to black, with pale to red-brown humeral stripe on each side, sometimes pruinose 13
- 13(12) Pale stripe in front of mesopleural suture constricted near upper end, then broadened at tip, not obscured by pruinescence 14
- Pale stripe in front of mesopleural suture not widened at tip, its inner margin commonly converging on mesopleural suture, sometimes obscured by pruinescence 15
- 14(13) Posterior lobe of pronotum with corners almost uniformly rounded; tergite 10 with or without pale anteromedian spot *alpinus*
- Posterior lobe of pronotum with corners slightly angulated; tergite 10 without pale anteromedian spot *brookhousei*
- 15(13) Outer face of mandible very dark brown to black, with pale basal patch *elke*
- Outer face of mandible largely pale 16
- 16(15) Uppermost point of mesanepisternal part of humeral stripe not at mesopleural suture, so that upper end of stripe appears peaked or truncate; not pruinose *chrysoides*
- Uppermost point of mesanepisternal part of humeral stripe at mesopleural suture, the upper part of stripe thus appearing acutely tapered; sometimes obscured by pruinescence ... 17
- 17(16) Black patch on metepimeron extending half-way down segment of metapleural suture above metastigma, its lower end usually truncate or bluntly angled *isabellae*
- Black patch on metepimeron extending well beyond half-way down upper segment of metapleural suture, or separated from it by long, gently tapering white stripe 18
- 18(17) Ratio between length of hindwing and length of metafemur approximately 5.0 (range 4.5-5.5); front of synthorax never strongly pruinose: *icteromelas* 19
- Ratio between length of hindwing and length of metafemur approximately 4.3 (range 4.0-4.6); mature adults with front of synthorax strongly pruinose 20
- 19(18) Labium largely pale, yellowish white *i. icteromelas*
- Labium largely brownish black *i. nigrolabiatius*
- 20(18) Pterostigma of mature adults brown; south-eastern New South Wales (south of Hunter River), Victoria *calcaris*
- Pterostigma of mature adults black; north-eastern New South Wales (north of Hunter River) *christine*

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