Two new Species of *Delma* (Lacertilia: Pygopodidae) from northeastern Queensland and a Note on the Status of the Genus *Aclys*

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Delma mitella sp. nov. and *Delma labialis* sp. nov. are described from two specimens each from northeastern Queensland. The new species are diagnosed on the basis of size, coloration and rostral scale shape. Records of *D. inornata* from northeastern Queensland are rejected. *Aclys* is diagnosed by two derived character states and, in the absence of a diagnosis for *Delma* that adequately demonstrates monophyly, retained as a genus distinct from *Delma*. A key to the *Delma* of Queensland and updated distribution maps are provided.

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Since the publication of Kluge's (1974) monograph of the Pygopodidae, only three new pygopodids have been described: *Pletholax gracilis edelensis* Storr, 1978, *Aprasia haroldi* Storr, 1978 and *Aprasia rostrata fusca* Storr, 1979[1]. This would suggest that knowledge of the alpha taxonomy of the family is nearly complete. The discovery of two spectacular new species of *Delma* with restricted known ranges in northeastern Queensland, described below, indicates that this is not the case.

I have followed the definitions of Kluge (1974) for measurements and body scalation, with the addition of head length, from tip of snout to rostral margin of ear, and hindlimb length, from junction of limb flap with body to distal tip of flap. The head length measurement of Kluge (1974) is here given as mouth length. The descriptions give measurement, in millimetres, followed in parentheses by the value of each measurement as a percentage of snout-vent length in the case of head length, hindlimb length and tail length, or as a percentage of head length, in the case of cephalic measurements. Measurements are linear, to the nearest 0.5mm for non-cephalic characters and to the nearest 0.05mm for cephalic characters.

Although the head shield characters defined and employed by Kluge (1974) are 'homologous quantitative characters' in terms of the reference points, they are not independent, with changes in one scale frequently affecting several characters, and do not fully describe the variation in individual scale morphology occurring between species. The stability of many head shields in *Delma* species allows the more conventional nomenclature used here. Rostral, rostral supranasal, caudal supranasal, postnasal, prefrontal, frontal, supraocular, parietal, occipital and upper temporal scales are labelled in Fig. 1. Supralabial, infralabial, nuchal and gular scale definitions follow Kluge (1974). Loreals are those scales bordering the dorsal margin of the supralabials, from the caudal margin of the postnasal up to and including the first scale contacting the enlarged subocular supralabial. Supraciliaries are those scales bordering the lateral margin of the supraoculars, from the scale contacting prefrontal to that contacting parietal. Preoculars are those small scales

1 Of the three species named by Wells and Wellington (1985), *'Delma wollemi'* and *'Pygopus territorianus'* are *nomina nuda* while *'Pygopus klugei'* is of uncertain status. *'P. klugei'* was differentiated from *P. nigriceps schraderi* on the basis of distinctly keeled body scales and a habitat restriction to black soil plains (*vs* smooth scales and red sand plains), and was described from a single specimen. However, Kluge (1974) included numerous specimens from black soil plains in his redescription of *P. n. schraderi*, only one of which had keeled scales.

between loreals, prefrontal, supraciliaries and the bony margin of the orbit, while suboculars are those scales bordering the dorsal margin of the subocular supralabial, but not contacting the preceding or succeeding supralabials.

Head shields are numbered rostrad to caudad, while longitudinal scale rows on body and tail are numbered from the dorsal midline.

Delma mitella sp. nov.
Figs 1,2

Holotype: Queensland Museum J32597, Herberton area, Qld. R. Russel.
Paratype: Australian Museum R65264, Koombooloomba rd, near Ravenshoe, Qld. T. Bentz, 19.xi.1967.

DIAGNOSIS: *D. mitella* differs from all other *Delma* species in its greater size (to 154mm SVL *vs* to 133mm, with only *D. fraseri*, *D. grayii*, *D. inornata* and *D. plebeia* attaining more than 115mm), almost straight or concave suture between rostral and rostral supranasals (*vs* obtusely gabled apex of rostral partly projecting between rostral supranasals) and presence of a dark line along fifth scale row from caudal body to tail, sharply demarcating dark dorsal and lateral surfaces from light ventral surface.

DESCRIPTION OF HOLOTYPE: Rostral barely projecting between rostral supranasals; rostral supranasal in broad contact with first supralabial; caudal supranasals present, in point contact with nostril; postnasal single; loreals five, subequal; preoculars nine (left) or ten (right); suboculars three, third elongate; supraciliaries five, caudalmost large and in line with preceeding series; supraoculars two, first longer; supralabials six, fourth below centre of eye, caudalmost low and elongate; infralabials seven, first pair narrowly separated on ventral midline, second pair widely separated; occipital present; upper temporals two; nuchal scales 13; gular scales 14.

Midbody scales 16; ventral scales 74; ventral body scales transversely enlarged; preanal scales three; hindlimb scales five.

Snout-vent length 150.5; head length 14.75 (9.8); mouth length 12.30 (83.4); snout length 6.35 (43.1); eye width 1.90 (12.9); postorbital length 3.85 (26.1); head width 8.60 (58.3); head depth 6.80 (46.1); rostral depth 1.35 (9.2); rostral width 2.95 (20.0); dorsal rostral length 0.90 (6.1); ventral rostral length 1.80 (12.2); hindlimb length 4.5 (3.0).

COLORATION (IN PRESERVATIVE): Dorsally and laterally mid-brown. Head slightly darker, with four narrow pale bands, irregular edged with black: first across head from third supralabial and rostral margin of orbit; second across head from fifth supralabial (where most prominent) and caudal margin of orbit; third from cranioventral margin of ear, along cranial margin of ear and across nape; fourth (very weakly defined) across nape a little way caudal to ear. Head markings do not extend ventral to supralabials.

Ventrally yellow-blue to light green, more yellow on throat, more blue ventrolaterally and on tail. A narrow dark blue-grey stripe sharply differentiating lateral from ventral surfaces, composed of small flecks on body, coalescing to a distinct stripe on fifth scale row of caudal half of body and tail.

VARIATION IN PARATYPE: Loreals four; preoculars seven; an additional subocular caudal to elongate third on right side; upper temporals fused into single scale on right side; first infralabials in contact; second infralabials moderately separated; nuchal scales 12; gular scales 15.

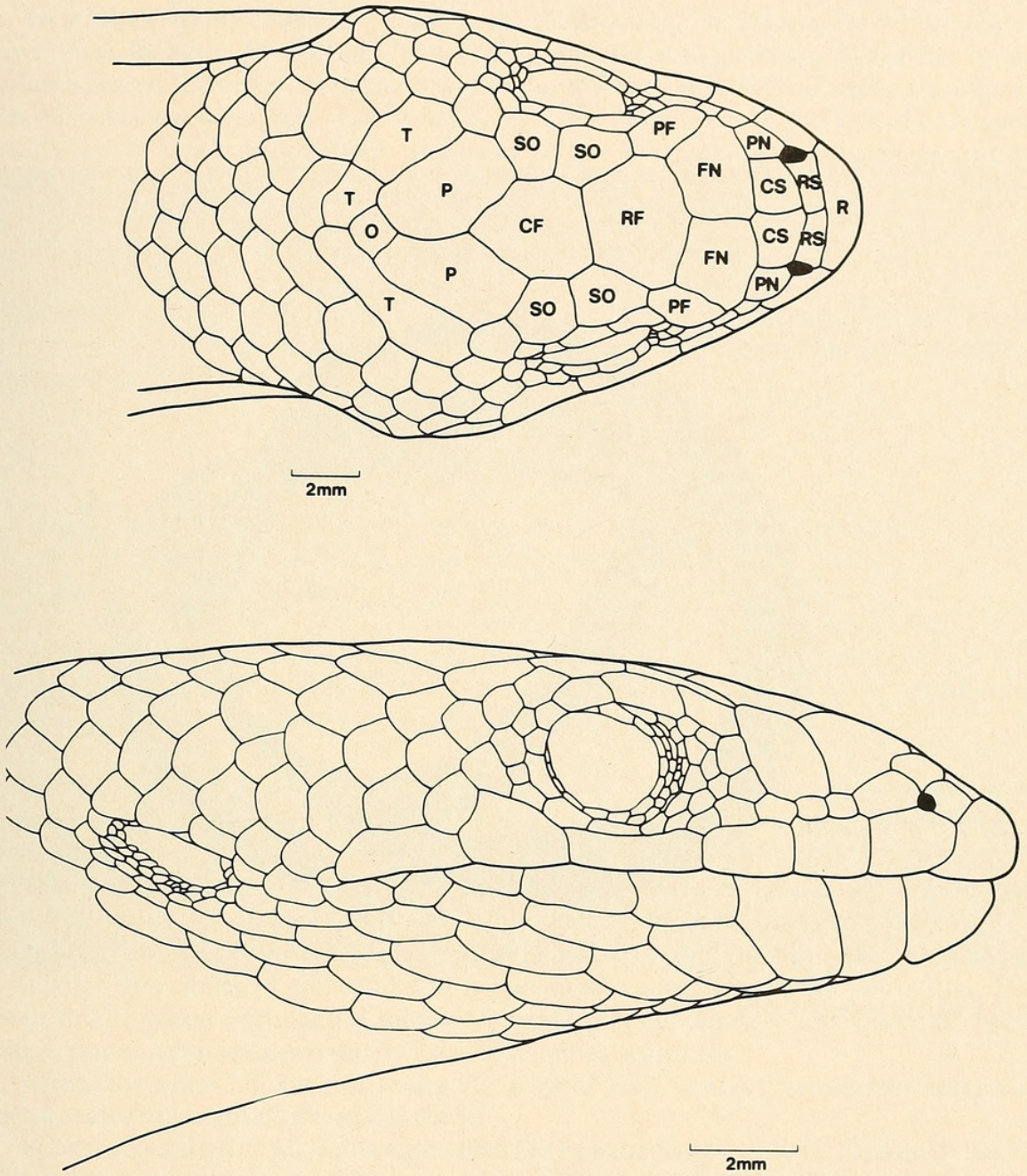

Fig. 1. Head shields of *Delma mitella*. Paratype (above) in dorsal view, holotype (below) in lateral view; CF = caudal frontal, CS = caudal supranasals, FN = frontonasals, O = occipital, P = parietals, PF = prefrontals, PN = postnasals, R = rostral, RF = rostral frontal, RS = rostral supranasals, SO = supraoculars, T = upper temporals.

Ventral scales 70; hindlimb scales four (left) or three (right); pair of ventral scales preceding preanals fused into a single v-shaped scale.

Snout-vent length 154; head length 15.50 (10.1); mouth length 13.90 (89.7); snout length 6.40 (41.3); eye width 2.10 (13.5); postorbital length 4.45 (28.7); head width 11.30 (72.9); rostral depth 1.45 (9.4); rostral width 3.50 (22.6); dorsal rostral length 0.85 (5.5); ventral rostral length 1.70 (11.0); hindlimb length 8.0 (5.2).

Coloration as for holotype, but fourth light head band almost absent.

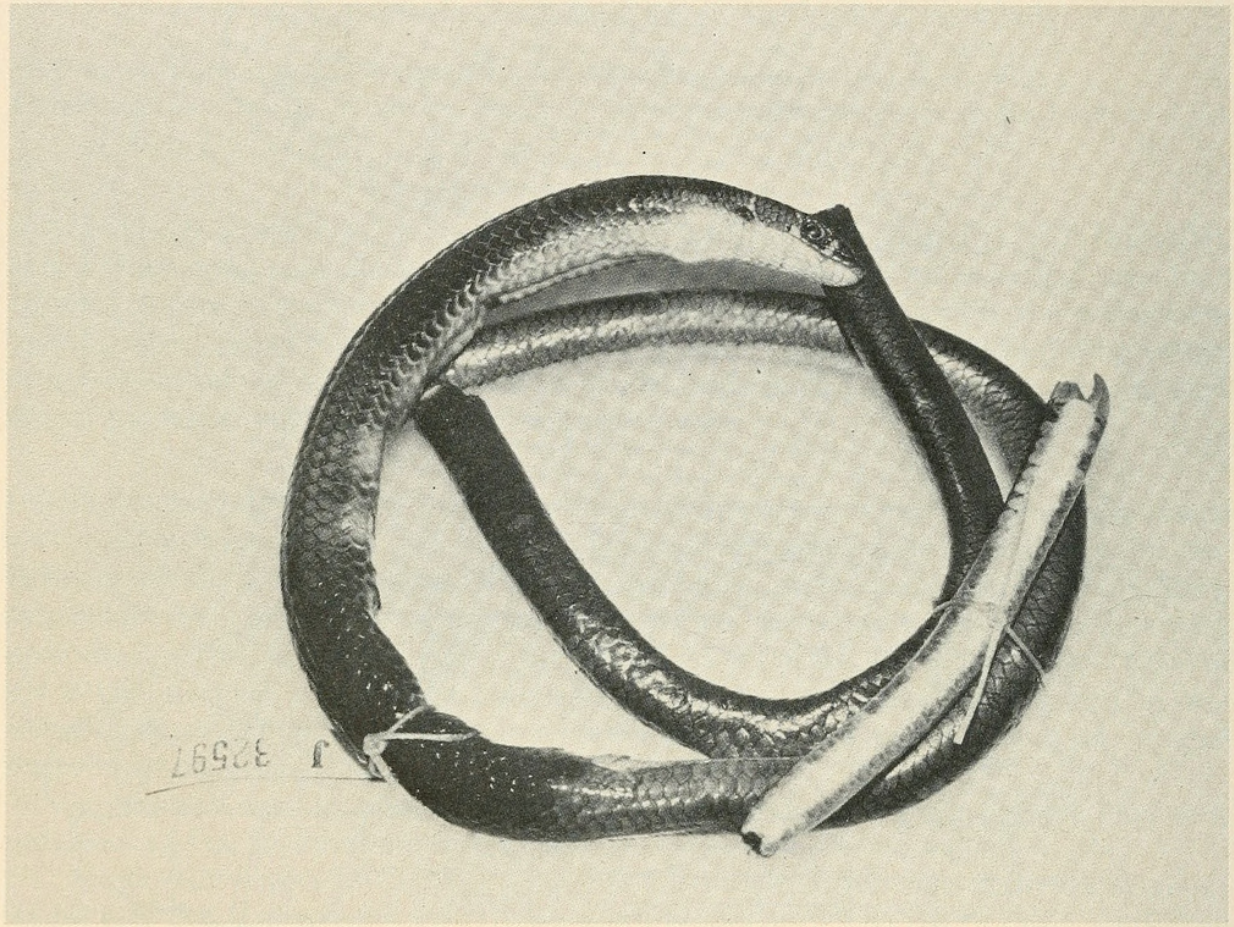

Fig. 2. Holotype of *Delma mitella*.

COLORATION (IN LIFE): A colour photograph of *D. mitella* appears on a Queensland National Parks and Wildlife Service poster, 'Reptiles of Queensland'. The specimen illustrated has body red-brown dorsally and laterally, the lateral margins of the scales slightly paler, producing an indistinct series of stripes similar to those reported for *D. inornata* (Thompson, 1980). Head dorsum mid-brown, slightly darker than body, with four narrow, irregularly black edged cream bands. Venter yellow on body and throat, but cream ventrolaterally on lips and neck, becoming blue-white ventrolaterally on body.

Iris black.

COMPARISON WITH OTHER SPECIES: *D. mitella* is a member of a group of *Delma* species possessing two pairs of supranasal scales, first supralabial distinct from rostral supranasal, fourth supralabial below centre of eye, a mode of 16 midbody scales, enlarged ventral body

scales and three preanal scales. Other members of this group are *D. borea*, *D. fraseri*, *D. grayii*, *D. inornata* and *D. nasuta*.

In addition to the characters given in the diagnosis, *D. mitella* may be differentiated from *D. borea* by having 4-5 loreals (*vs* usually three), from *D. grayii* and *D. inornata* by the caudal supranasal contacting or narrowly separated from nostril (*vs* broadly separated), from the nearest populations of *D. nasuta* by its much blunter snout and lack of dark spots dorsally and ventrally on the body and from *D. fraseri* by lacking dark markings on the throat.

HABITS AND HABITATS: The paratype was found dead on road at 1905hrs.

ETYMOLOGY: The specific epithet is from the Latin *mitella*, a bandage on the head, sometimes worn to counteract the effect of wine, in allusion to the characteristic head markings of this species.

Delma labialis sp. nov.
Figs 3,4,5

Holotype: QM J45563, Paluma turnoff on Bruce Hwy, north of Townsville, Qld, in 18°59′S 146°18′E. G. V. Czechura, S. K. Wilson, 13.iv.1985.
Paratype: QM J30265, Magnetic Island, Qld. T. Low, viii.1976.

DIAGNOSIS: *D. labialis* differs from all other *Delma* species in having a lip and lateral neck pattern of alternating mid-brown and cream bars, and a dark brown stripe on the third scale row on caudal body and tail, separating dorsal from lateral surface.

DESCRIPTION OF HOLOTYPE: Rostral with obtuse apex, distinctly penetrating between rostral supranasals; rostral supranasal in moderate contact with first supralabial; caudal supranasals present, in broad contact with nostril; postnasal single; loreals four, subequal; preoculars eight (left) or ten (right); suboculars six (left) or four (right), subequal; supraciliaries five, caudalmost only slightly larger and lying medially to others; supraoculars two, first longer, second (right) divided into lateral and medial scale; supralabials six, fourth below centre of eye, caudalmost subequal to penultimate; infralabials six, first pair in broad contact on ventral midline, second pair moderately separated; occipital present; upper temporals two; nuchal scales 16; gular scales 18.

Midbody scales 16; ventral scales 72; ventral body scales transversely enlarged; preanal scales three; hindlimb scales three.

Snout-vent length 103.5; tail length 408.0 (394); head length 12.10 (11.7); mouth length 9.35 (77.3); snout length 4.95 (40.9); eye width 1.70 (14.0); postorbital length 2.05 (16.9); head width 6.65 (55.0); head depth 5.60 (46.3); rostral depth 1.20 (9.9); rostral width 2.35 (19.4); dorsal rostral length 0.70 (5.8); ventral rostral length 1.25 (10.3); hindlimb length 4.5 (4.3).

COLORATION (IN PRESERVATIVE): Dorsally and laterally mid-brown. Head slightly more yellow-brown. A series of alternating cream and mid-brown bars on lips and laterally on neck from caudal margin of orbit to cranial third of body. A narrow dark grey stripe along centre of third scale row from caudal third of body to proximal half of tail.

Ventrally immaculate cream.

VARIATION IN PARATYPE: The paratype is very desiccated and the scalation difficult to determine in places, but definitely differs from the holotype in having five infralabials on the right side (six on left); 18 midbody scales and 71 ventral scales.

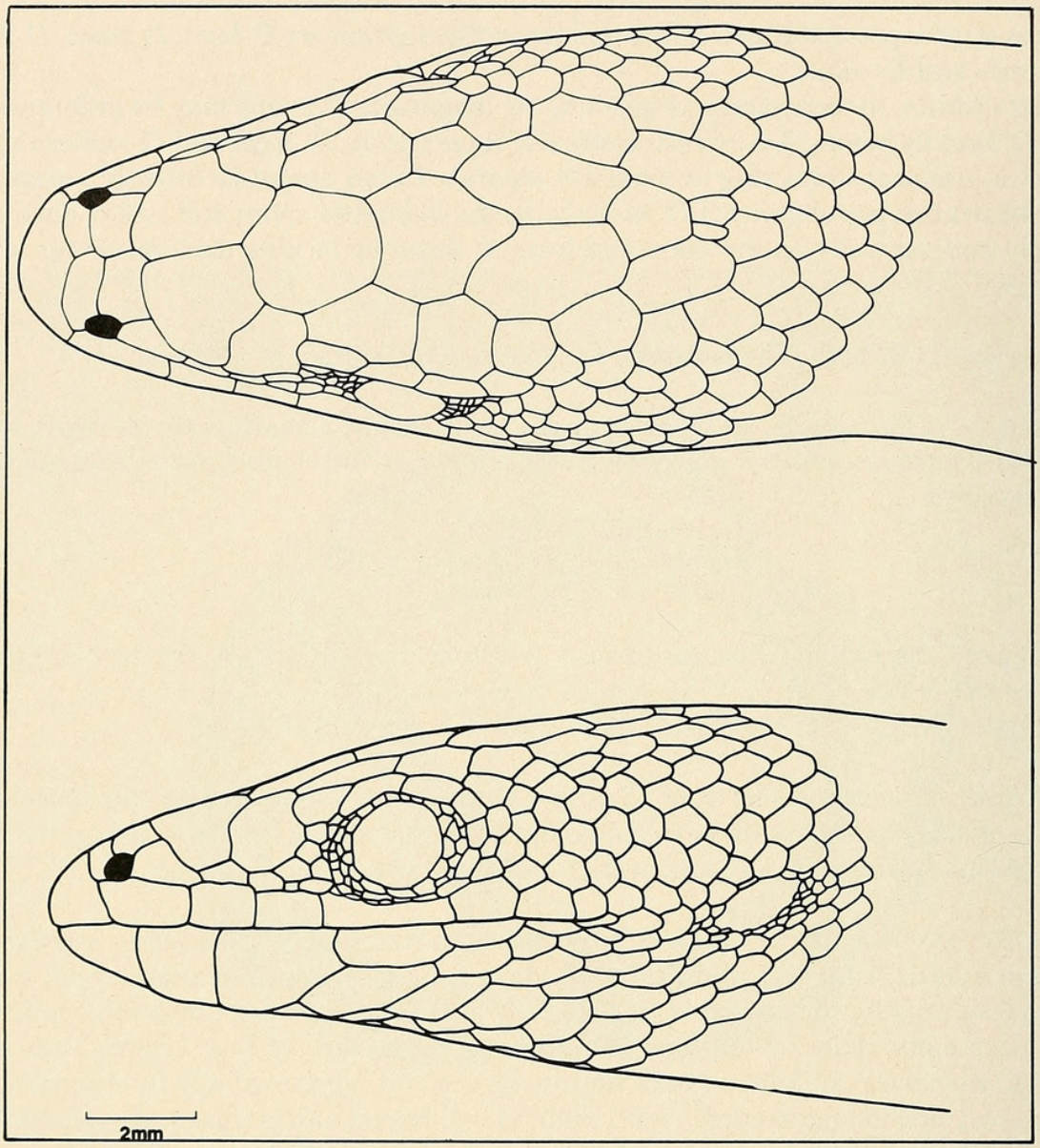

Fig. 3. Head shields of holotype of *Delma labialis*.

Snout-vent length 115.0; tail length 446.0 (388); head length 12.50 (10.9); mouth length 10.70 (85.6); snout length 4.90 (39.2); eye width 1.85 (14.8); postorbital length 2.95 (23.6); head width 6.80 (54.4); head depth 5.40 (43.2); rostral depth 1.40 (11.2); rostral width 2.55 (20.4); dorsal rostral length 1.15 (9.2); ventral rostral length 1.15 (9.2); hindlimb length 3.5 (3.0).

Coloration as for holotype.

COLORATION (IN LIFE): Kodachrome transparencies of three individuals taken by S. K. Wilson, A. Dudley and G. Husband permit the following notes on coloration in life.

Adult body dorsum red-brown becoming grey-brown on tail and cranial third of body. Slightly paler lateral margins to body scales, producing faint indications of stripes of dorsal ground. Head dorsum yellow-brown. Lip markings yellow-brown and cream. Iris black.

Juvenile body dorsum grey-brown, becoming yellow-brown on head and tail. Lip markings yellow-brown and pale yellow. Iris black.

COMPARISON WITH OTHER SPECIES: *D. labialis* is a member of the same group of *Delma* species as *D. mitella*, and may be differentiated from other members of this group by its

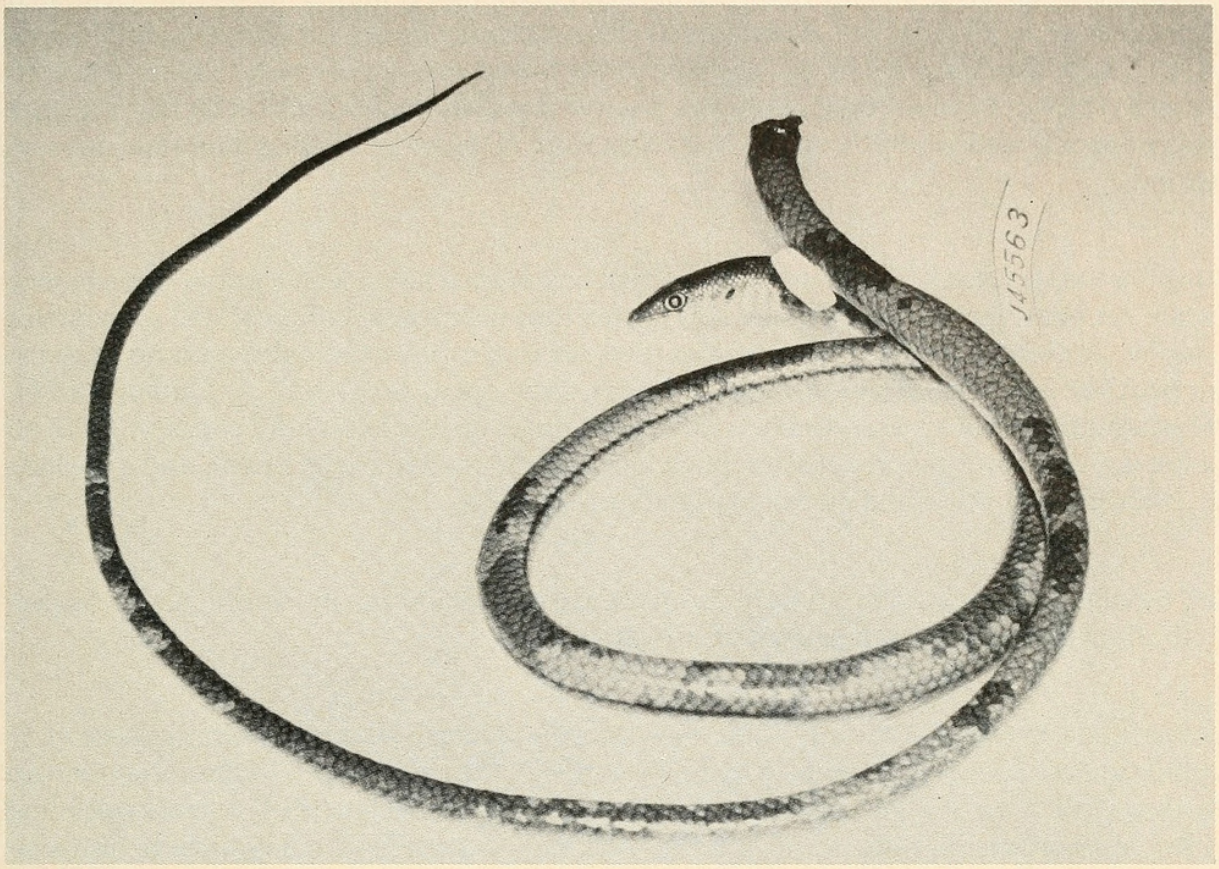

Fig. 4. Holotype of *Delma labialis*.

Fig. 5. Details of head of holotype of *Delma labialis* in life. (Photo: S. Wilson).

dorsolateral tail stripe and the nature of the head markings. It may be further differentiated from *D. borea* by its more numerous loreals (four *vs* usually three) and infralabials (5-6 *vs* 4-6, x = 4.5), from *D. grayii* and *D. inornata* by the broad contact of caudal supranasal with nostril (*vs* broadly separated), from the nearest populations of *D. nasuta* by lacking dark spots dorsally and ventrally on the body and from *D. fraseri* by lacking dark markings on throat.

HABITS AND HABITAT: The holotype was taken in low open forest with a grassy understorey, while the paratype was taken under corrugated iron near a beach. Low (1978) records this species, as *Delma inornata*(?), from 'under sheets of iron in low open forest on sand adjacent to beaches; one seen active at midday on dry, very open, rocky hill'. A. Dudley and G. Husband (*pers. comm.*) observed two specimens on Magnetic Island in February, 1985: an adult active during day in wet sclerophyll forest on the road to Nellie Beach, and a juvenile in litter in open woodland on the road to Horseshoe Bay.

ETYMOLOGY: The specific epithet is from the Latin *labium*, a lip, in allusion to the distinctive labial and lateral neck pattern of this species.

SYMPATRIC SPECIES: The only *Delma* species with a distribution overlapping those of *D. mitella* and *D. labialis* is *D. tincta* (Fig. 6; Shea, 1987), which is readily differentiated from both species by its smaller size and very different scalation. Kluge (1974) records collecting a live *D. inornata* 'a few miles south of Townsville', but does not list this specimen in his specimens examined lists or on the distribution map, nor does he question three specimens (British Museum (Natural History) 98.10.19.4-8, D. le Souef; examined) from Cooktown. These localities are respectively 620km and 1050km north of the nearest *D. inornata* locality (Marmor, Qld), itself 430km north of the main body of the species' range, which reaches Oakey, Qld (Shea, 1987), while more recent collections from both localities have not included this species. The Townsville and Cooktown records must be assumed to be in error.

THE STATUS OF *ACLYS*: Kluge (1976) reduced the monotypic *Aclys* to a subgenus of *Delma*, largely to resolve the discrepancy between relationships as suggested by external morphology (Kluge, 1974) and osteology (Kluge, 1976). This arrangement has received little acceptance. *Aclys* has been retained as a genus by Storr *et al.* (1983), Storr and Harold (1980a,b), Cogger (1983) and Cogger *et al.* (1983) without comment.

Examination of the data matrix provided by Kluge (1976) suggests that the discrepancy between data sets is partly a result of a lack of definition for *Delma* that adequately demonstrates monophyly. Of the nine skeletal characters keyed as derived for both *Aclys* and *Delma*, one, the presence of two cloacal bones per side, is shared only with *Ophidiocephalus*, while the other eight (characters 11, 19, 20, 49, 59, 65, 67 and 71 of Kluge, 1976) are all shared with two or more genera each. In contrast, only three of the thirteen phenetic external diagnostic characters (Kluge, 1974) are shared by *Aclys* and *Delma*: large external auditory meatus (primitive, and therefore unsuitable for inferring relationships), smooth scales (shared with most other pygopodid genera) and preanal pores absent (shared with *Aprasia*, *Ophidiocephalus* and *Pletholax*). *Aclys* has two uniquely derived external character states among the Pygopodidae: upper temporal scales greatly enlarged, forming a second pair of 'parietals' and rostral separating rostral supranasals on dorsal midline. There is little evidence for a sister group relationship between *Aclys* and *Delma*, and pending a more adequate diagnosis for *Delma*, the two genera are here considered distinct.

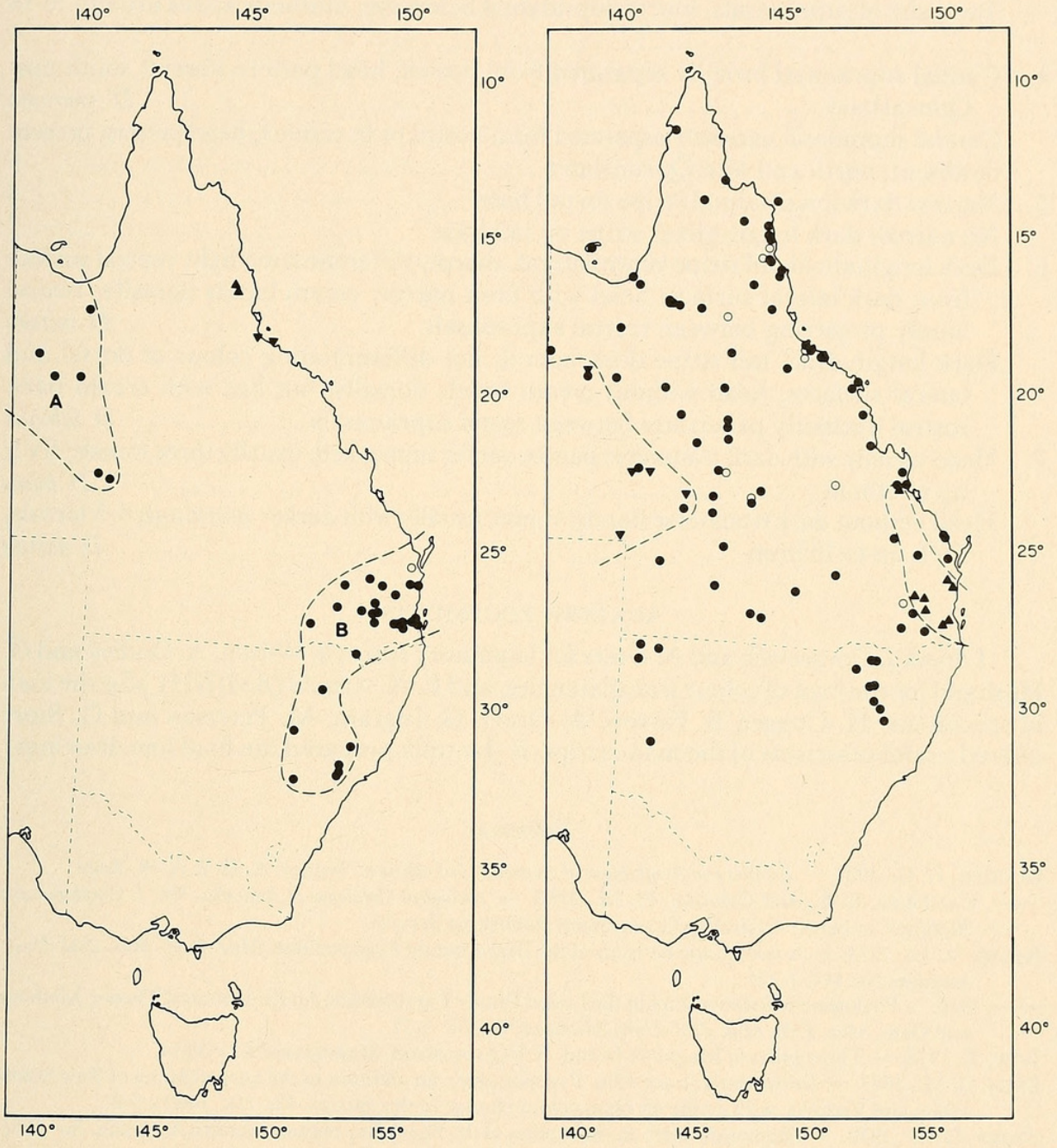

Fig. 6. Distribution of *Delma* species in eastern Australia. Left: *Delma borea* (A), *D. plebeia* (B), *D. mitella* (▲), *D. labialis* (▼). Right: *D. tincta* (●), *D. torquata* (▲), *D. nasuta* (northern form) (▼). Based on specimens examined in the Australian Museum and Queensland Museum collections. Open symbols are literature records from Kluge (1974).

KEY TO THE GENUS *DELMA* IN QUEENSLAND

1. Preanal scales two 2
   Preanal scales three 3
2. Head grey, throat white, dark collar variably present on nape, lips barred, venter cream ..... *D. plebeia*
   Head and throat black with narrow cream or white bands, venter dark grey ..... *D. torquata*

3. Single pair of supranasals, third supralabial below eye, midbody scales usually 14 ..... *D. tincta*
   Two pairs of supranasals, fourth supralabial below eye, midbody scales usually 16-18 4
4. Caudal supranasal broadly separated from nostril; head pattern absent; south-east Queensland ..... *D. inornata*
   Caudal supranasal narrowly separated from nostril or in contact; head pattern present or absent; north and west Queensland 5
5. Narrow dark longitudinal stripe on tail base 6
   No narrow dark longitudinal stripe on tail base 7
6. Dark longitudinal tail stripe ventrolateral, sharply differentiating light ventral surface from dark lateral surface; head with faint narrow cream bands dorsally; rostral barely projecting between rostral supranasals ..... *D. mitella*
   Dark longitudinal tail stripe dorsolateral, not differentiating colour of dorsal and lateral surfaces; head without cream bands dorsally, but lips with cream bars; rostral distinctly penetrates between rostal supranasals ..... *D. labialis*
7. Head usually with dark transverse bands; venter unmarked; usually three loreals; SVL up to 90mm ..... *D. borea*
   Head without dark transverse bands; venter usually with darker markings; 4-5 loreals; SVL up to 105mm ..... *D. nasuta*

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