The ants of the Papuasian genus *Dacetinops* (Hymenoptera: Formicidae: Myrmicinae)

ROBERT W. TAYLOR

Abstract. Four species of *Dacetinops* are reported from Borneo (*D. cirrosus* n. sp., *D. concinnus* Taylor, *D. solivagus* n. sp., and *D. wilsoni* n. sp.), and three from Papua New Guinea (*D. cibdelus* Brown and Wilson, *D. darlingtoni* n. sp., and *D. ignotus* n. sp.). The Bornean species are all sympatric in western Sarawak. Elsewhere, *D. cirrosus, concinnus,* and *solivagus* are known from eastern Sabah, *D. concinnus* from the extreme southeast of Indonesian Kalimantan, and *D. cirrosus* from Trengganu and Johore States on peninsular Malaysia. *Dacetinops* is known on New Guinea only north of the axial cordillera, where *D. cibdelus* is widespread between about longitudes 145°30′ and 148°30′ E, and the other species are known only from the Popondetta-Kokoda area (Northern Province), where both are sympatric with *D. cibdelus.* Males of the genus are characterized for the first time, and females described for six species. Some inadequately understood attributes of scanning electron micrograph plates, as used in this paper, and more generally in insect taxonomy, are reviewed.

Introduction

The myrmicine ant genus *Dacetinops* Brown & Wilson currently includes seven known species, five of which are described here as new.

These insects first attracted scientific attention in May 1955, when 10 workers, three dealate females, and several larvae were collected near Lae, Papua New Guinea, by Edward O. Wilson. These became the types of *D. cibdelus*[1] Brown and Wilson (1957), type-species of the new genus *Dacetinops*. The larvae were described by G.C. and J. Wheeler (1957).

It is of some interest that several specimens of *D. cibdelus* had in fact been taken over 50 years previously in the Astrolabe Bay area, by the pioneerng Hungarian New Guinea collector Lajos Biró, whose history has been narrated by Balogh and Allodiatoris (1972). These specimens were not detected among unsorted accessions in the Hungarian Natural History Museum, Budapest, until recently recognised by the author.

[1] Under a 1972 decision of the International Commission on Zoological Nomenclature, concerning Article 30(a)(i)(2) of the International Code of Zoological Nomenclature, all names of the genus group ending in *-ops* must take the masculine gender (Bull. zool. Nomencl. 29 (4): 180–182). This applies to *Dacetinops*, despite its grammatically correct feminine attribution by previous authors.

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The second described *Dacetinops* species, *D. concinnus* Taylor (1965), was discovered in January 1963, when Alfred E. Emerson collected four workers at Nanga Tekalit field camp in the First (western) Division of Sarawak.

Four species are now known from Borneo (*D. cirrosus* n.sp., *D. concinnus, D. solivagus* n. sp., and *D. wilsoni* n.sp.), and three from Papua New Guinea ((*D. cibdelus, D. darlingtoni* n.sp., and *D. ignotus* n.sp.). One Bornean species, *D. cirrosus*, is known also from Trengganu and Johore States, West Malaysia. *Dacetinops* thus ranges at least from peninsular Malaysia to eastern New Guinea. More species must occur in the intervening Indonesian archipelago and West Irian, and the genus could range further into the Philippines, eastern Melanesia, and possibly also Indo-China and Northern Australia.

Several species reviewed here are represented by long series of adults taken at various localities. Workers are known for all, females for all except *D. darlingtoni*, and males for *D. cirrosus* and *D. concinnus*. I collected most of the series reviewed here, during visits to west Malaysia and Borneo in 1968 and Papua New Guinea in 1972. Most specimens (including the immature stages of several species) are deposited in the Australian National Insect Collection, Canberra, with duplicates dispersed widely among collections elsewhere, including those designated below with abbreviation codes, and other major ant collections. Other collectors include B. Bolton, W.L. Brown Jr., Y. Hirashima, B.B. Lowery, S.B. Peck, and P.M. Room, Rev. Lowery is cited in the lists of records below as BBL; I am RWT.

Dacetinops is one of several biogeographically interesting S.E. Asia based ant genera which have contributed endemic species to the New Guinean fauna. Accordingly this paper is dedicated to the late Professor Philip J. Darlington, Jr., of Harvard University, to acknowledge his contributions, both to the insect biogeography of New Guinea, and to biogeography in general. *Dacetinops darlingtoni,* described below, is named in his honour.

Brown and Wilson (1957: 1–2) have adequately defined *Dacetinops* on the basis of worker attributes, but some qualifications to their general description are required, in light of the new species described here. Differentiation of a 'fairly distinct' 3-jointed antennal club is not universal; the mesosomal profile is not broadly arched in all species, but indented at the mesonotal-propodeal junction in some; propodeal teeth are lacking in *D. darlingtoni* and *D. ignotus*; general statements concerning the sculpturation must be qualified to accommodate *D. darlingtoni* (Fig. 22–24) and *D. solivagus* (Figs. 28–30), and the mandibles are smooth and unsculptured in several species; the pilosity is spectacularly long and abundant in some species, notably in *D. cirrosus* (Figs. 16–18) and *D. solivagus*, and the general bilateral placement of hairs is somewhat compromised in these; the pilosity is greatly reduced in *D. darlingtoni*, which also lacks a clypeal apron. The worker palpal formula in all seven species has been confirmed by dissection to be *maxillary 2: labial 2.*

Males of the genus are described below for the first time, and a general generic

diagnosis is attempted (see below under *D. concinnus*). New details of female structure are reported, including the wing venation (see discussion below under *D. wilsoni)*. The palpal formula of the alate castes is also *maxillary 2: labial 2.*

Workers and females of *Dacetinops* may be minimally diagnosed as follows: *Myrmicine ants; antennae 11-jointed; mandibles short, triangular, their masticatory borders finely crenulate and fully opposable; petiole and postpetiole bearing well developed masses of spongiform material.* The spongiform masses are well illustrated in the figures below. Such structures are found elsewhere among ants *only* in some genera of the myrmicine tribe Dacetini, notably those of its subtribe Strumigeniti. Almost all living dacetines have fewer than 6 antennal joints. The exceptions are two primitive Neotropical genera, *Daceton* Perty and *Acanthognathus* Mayr, which have 11-jointed antennae, like *Dacetinops*. They, however, have very different elongate mandibles, the generally edentate shafts of which carry several enlarged, spinose and interdigitating apical teeth. In addition, these genera, unlike *Dacetinops* and the more derived dacetines, lack spongiform material on the waist nodes (Brown and Wilson 1959). There can be little doubt that spongiform masses have evolved independently in *Dacetinops* and the higher Dacetini, providing a striking example of detailed evolutionary convergence.

Abbreviations and details of the measurements and indices used below are given in the caption to Table 1.

The following abbreviations are used for institutions: ANIC – Australian National Insect Collection, CSIRO, Canberra; BISHOP – B.P. Bishop Museum, Honolulu, Hawaii; BM(NH) – British Museum (Natural History), London; GM – Museum d'Histoire Naturelle, Geneva, Switzerland; HNM – Hungarian Natural History Museum, Budapest; KUB – Masao Kubota Collection, Odawara City, Japan; MCZ – Museum of Comparative Zoology, Cambridge, Mass., U.S.A.; SAR – Sarawak Museum, Kuching.

Illustrations

Figures 1–6 are by Mr. S.P. Kim, and I prepared the scanning electron micrographs of Figures 7–33, using a J.E.O.L. JSM U3 microscope. The subject specimens were gold or gold-palladium coated for this purpose.

Such micrographs are now standard in much insect taxonomy. Several matters regarding their use are not widely understood and require comment. The advice of Mr C.D. Beaton on these items is gratefully acknowledged.

The indication of absolute scale

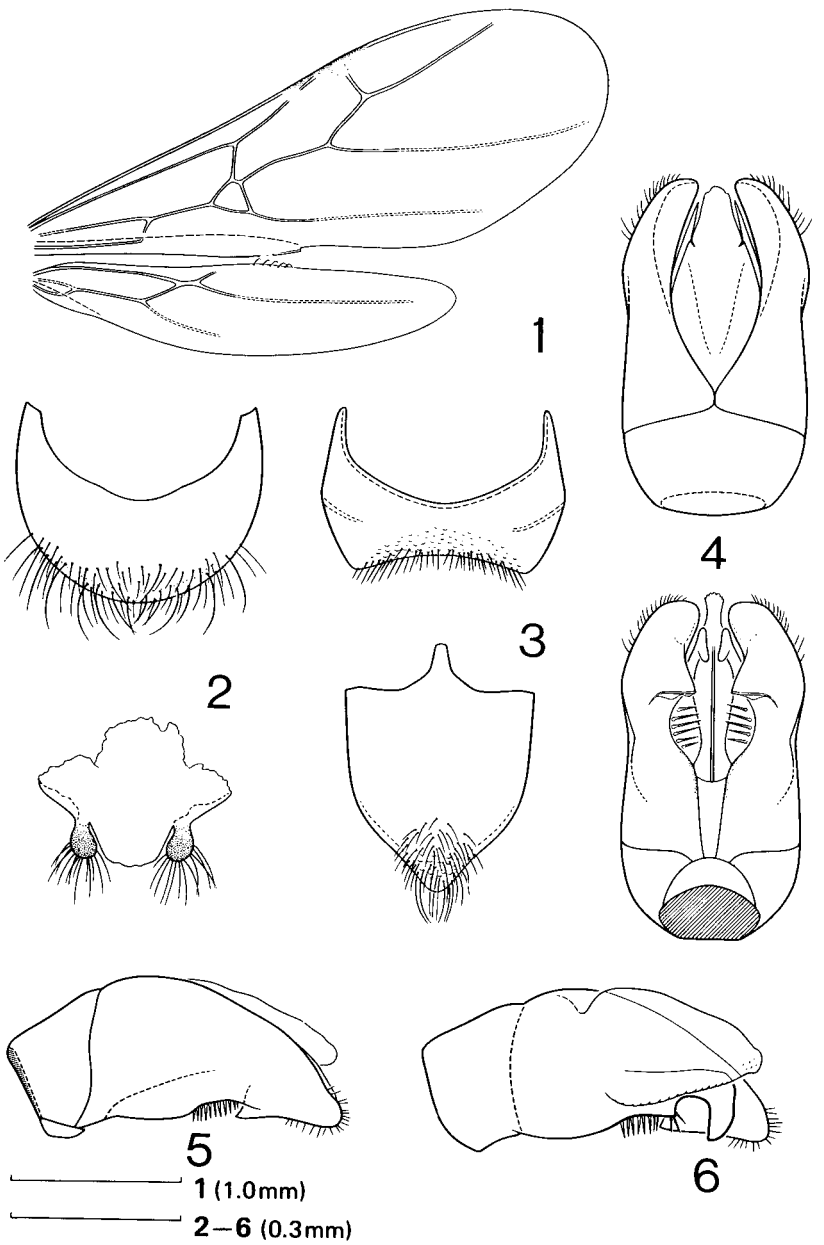
The depth of field of the scanning electron microscope is enormous compared to the eye, the light microscope or the camera, so that specimens of considerable

Table 1. Measurements and indices of workers of the known *Dacetinops* species. Details are given for the smallest and largest specimens (selected on the basis of HW measurement) in each class, and for all holotypes designated in this paper. Figures for the *D. cibdelus* and *D. concinnus* types are ranges, extracted from Brown and Wilson (1957) and Taylor (1965).

TL in mm, other measurements in units of 0.01 mm. TL = aggregate total length, HL = maximum head length, HW = maximum head width, CI = cephalic index (HW × 100/HL), ML = exposed length of mandibles, MI = mandibulo – cephalic index (ML × 100/HL), SL = maximum chord length of scape, SI = scape index (SL × 100/HW), WL = lateral length of mesosoma ('Weber's length'), pet.L = length of petiole (lateral ICD = index of cephalic depression (maximum head depth × 100/HL).

Species	Class	N	TL	HL	HW	CI	ML	MI	SL	SI	WL	pet.L	ICD
D. cibdelus	Types	10	2.2–2.7	54–64	50–59	91–93	15–16	24–27	–	–	65–76	18–22	*c.*63
	This study	31	2.3,2.7	54,63	50,59	93,94	14,17	26,27	33,38	66,64	67,76	19,24	67,65
D. cirrosus	Trengganu	5	4.4,4.7	101,107	90,96	89,90	29,32	29,30	62,65	69,68	127,135	43,46	59,60
	Johore	2	4.3,4.5	98,102	85,89	87,87	28,30	29,29	59,61	69,69	121,127	44,45	60,61
	W.Sarawak	5[1]	4.1,4.3	94,102	78,85	83,83	28,29	30,28	61,65	78,76	117,124	37,41	61,59
	E.Sarawak	5	3.7,4.2	88,98	70,80	80,82	25,28	28,29	57,62	81,77	105,118	35,38	59,58
	Sabah	58	3.7,4.2	87,99	72,84	83,85	26,29	30,29	57,63	79,75	112,120	35,41	60,60
D. concinnus	Types	3	4.5–5.0	112–122	101–109	89–90	34–38	30–32	–	–	142–157	45–52	59–60
	This study	65	4.8,5.3	111,121	98,110	88,91	34,38	31,31	68,75	68,69	144,161	47,50	59,60
D. darlingtoni	holotype	1	2.9	70	61	87	17	24	44	72	84	23	60
D. ignotus	types	12[1]	2.4,2.9	58,67	53,60	91,90	16,18	27,27	40,43	75,72	69,78	22,25	66,64
D. solivagus	Sarawak	2[2]	2.9,–	73,76	54,57	74,75	20,21	27,28	49,52	91,91	83,88	27,30	58,55
	Sabah	1	3.1	80	59	74	21	26	53	90	92	30	56
D. wilsoni	holotype	1	2.9	71	58	82	19	27	46	79	81	25	59
	paratypes	37	2.7,3.0	68,74	55,61	81,82	18,21	26,28	44,48	80,79	78,84	24,26	59,59

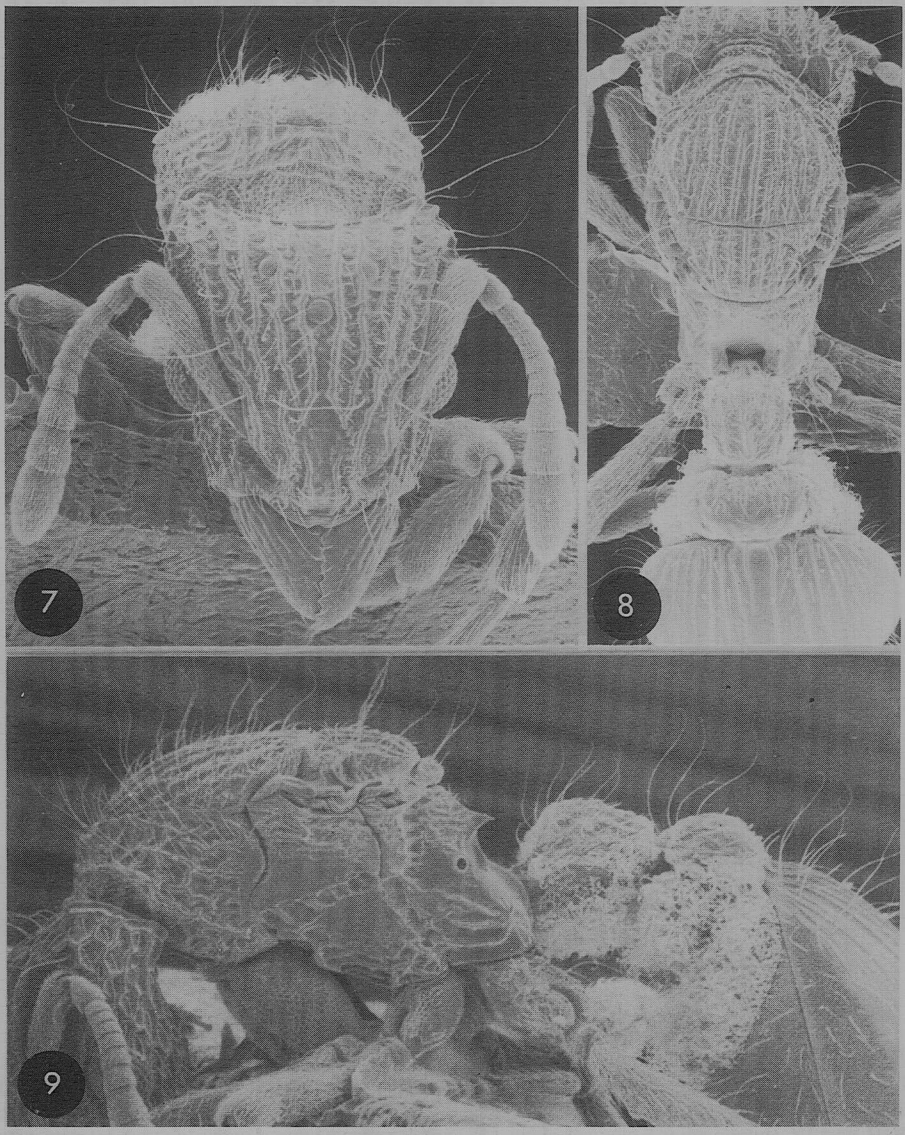
[1] The largest specimen cited is the holotype; [2] The smallest specimen cited is the holotype.



Figures 1–6. Dacetinops, details of male and female features: (1) *Dacetinops cirrosus*, female, Lungmanis, Sabah, wing venation. (*2–6*) *Dacetinops concinnus*, male, Quoin Hill, Sabah, terminal abdominal sclerites and genitalia: (2) tergites VIII (pygidium) and X + XI dorsal view; (3) sternites VIII and IX (hypopygium), ventral view; (4) genital capsule, dorsal view (above), ventral view (below); (5) genital capsule, lateral view; (6) genital capsule, mesal view of right half, dissected to show penis valve, volsella and inner aspect of gonoforceps.

relative depth can be illustrated entirely in focus. For example, the pronotum in Figure 22 lies well behind the head, yet it is just as clearly in focus (as, incidentally, are all three left-side legs).

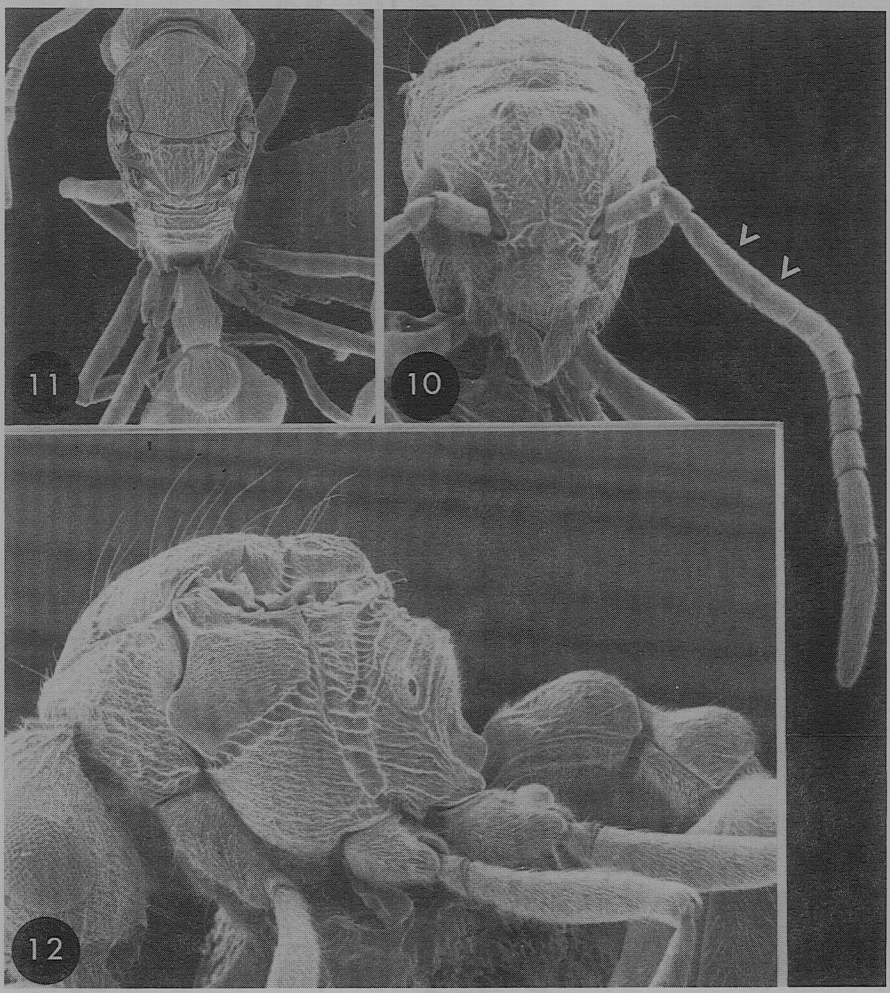
Accurate determination of the relative widths of the head and pronotum from that figure would, however, require each to be measured with a ruler of different scale; since one is, in effect, more distant from the image plane than the other. It follows that any scale line can be accurate for only one of the infinite number of



Figures 7–9. Dacetinops wilsoni, paratype female, standard views. HW 0.65 mm; scutum width 0.55 mm; WL 1.00 mm.

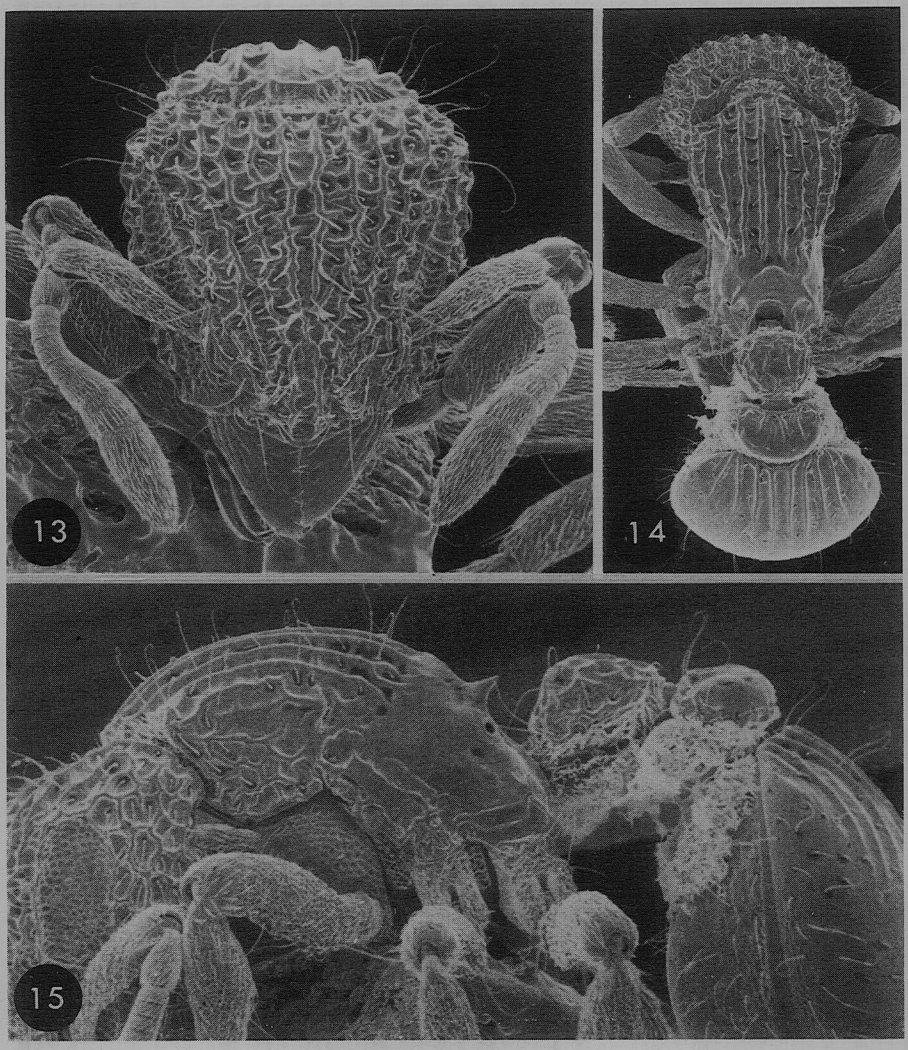
planes which could be specified normal to the viewing axis in a scanning electron micrograph and within its depth of field.

For this reason absolute scale is indicated below by stating in each figure caption the measurement for a relevant dimension of the specimen illustrated; usually Head Width, Pronotum Width or Weber's Length of the mesosoma, as defined in Table 1. These were determined directly from the specimens themselves, using an optical stereomicroscope and eyepiece ruler. Such indications of scale, as defined, apply only to the dimensions specified, regardless of what else is illustrated. This technique is accurate and relevant, and its use elsewhere is recommended. Editorial requirements that such micrographs must carry scale lines are not justified in light of these facts.



Figures 10–12. Dacetinops concinnus, male, Quoin Hill, Sabah, standard views (wings removed). HW (across eyes) 0.83 mm; scutum width 0.71 mm; WL 1.33 mm.

Most electron microscopes can print a scale or magnification factor (e.g. 20×) on the pictures they generate. These are also subject to the problem reviewed above, and are, at best, only approximate, even if the relevant plane is known. Magnification factors in work of this kind acquire error if illustrations bearing them are reproduced at a size other than that of the finished original, and are almost meaningless in any case. A user of Figure 19 is much better served by knowledge that the specimen illustrated has a Head Width of 1.0 mm, than that it is magnified 45× in the illustration!



Figures 13–15. Dacetinops cibdelus, worker, 'Timber Track', New Guinea, standard views. HW 0.58 mm; Pronotum width 0.43 mm; WL 0.74 mm.

Representation of the proportions of structures being illustrated

An electron microscope must be critically adjusted to avoid distortion along the axes normal to the viewing axis. Otherwise square objects would appear oblong or rhomboid, depending on their orientation. The same applies when a square object is foreshortened when viewed obliquely, through being tilted away from the image plane. Astigmatism and curvature of field can likewise distort the perception of shape. Depth perception by the eye is confused by the deep focus of scanning micrographs, so that it is not possible to judge whether a given structure, such as the head of a *Dacetinops* specimen, or the scape of an antenna on that head, is parallel to the image plane or not. Nor can one estimate the angles of inclination involved, without intimate knowledge of appropriate dimensons of the subject specimen – Head Length, Head Width, and Scape Length in this example. For these reasons scanning micrographs cannot be used to calculate or to confirm the exact proportions of an illustrated structure, or the dimensions of one structure relative to another. These matters are indicated above for the species of *Dacetinops* using critical measurements and indices (Table 1), since this is the only way they can be communicated accurately. The scanning micrographs contain a wealth of other relevant information, but they cannot represent relative proportions in exact detail.

Key to the species of *Dacetinops* (workers)

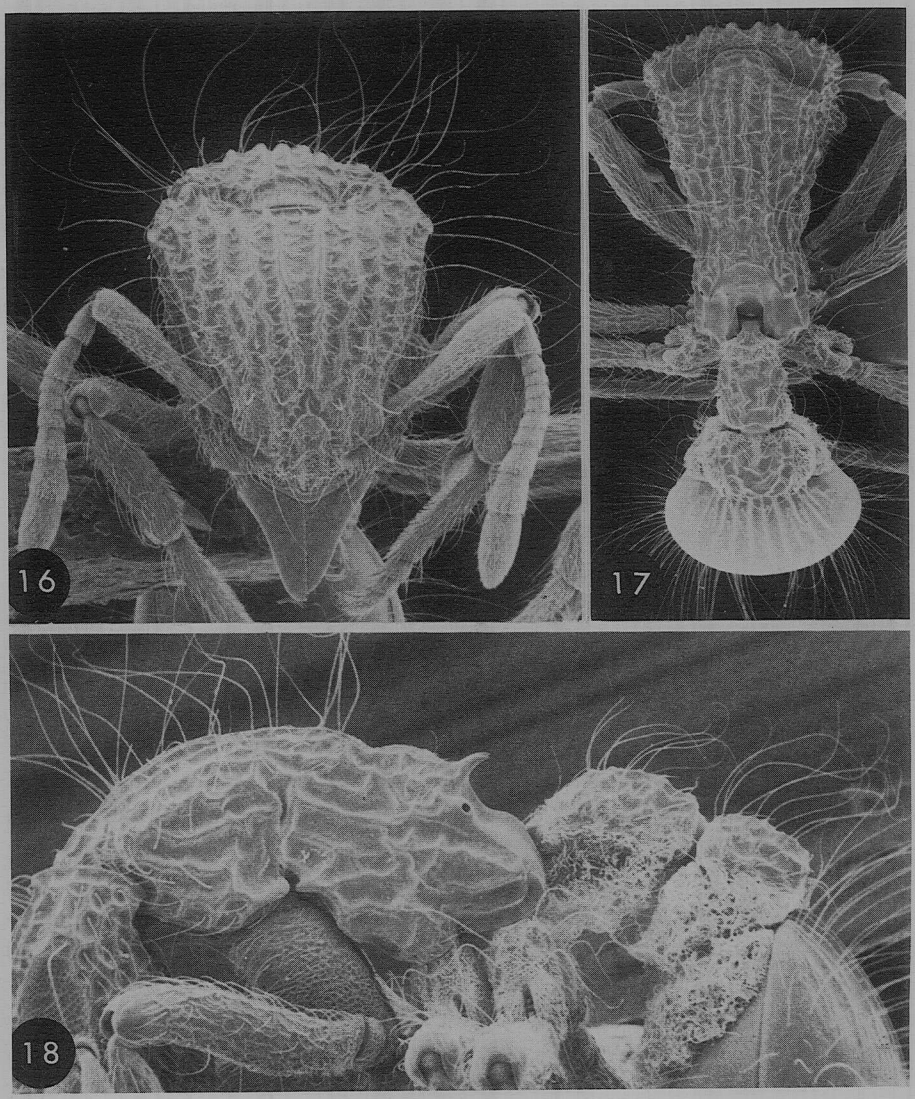
1. *a* Species of peninsular Malaysia or Borneo 2
   b New Guinean species 5

2(1) *a* Smaller species, HW 0.54–0.61 mm; eyes relatively small and obscure, with about 10 distinct facets; maximum ocular diameter clearly much less than width of apical antennomere 3
   b Larger species, HW 0.70–1.10 mm; eyes relatively large and prominent, with 18 to 40 distinct facets; maximum ocular diameter about equal to, or clearly exceeding, width of apical antennomere 4

3(2) *a* Head relatively narrow, CI<75; mandibles smooth and shining, median portions of their outer borders distinctly and strongly concave (Fig. 28); longitudinal costation of mesosomal dorsum somewhat obscure, the costae broken and wavy in outline, intervening spaces strongly microsculptured, with some transverse elements contributing to an overall rugose appearance. (Fig. 29) ..... *D. solivagus* n.sp.
   b Head relatively broad, CI>81; mandibles almost entirely strongly striate, their outer borders more-or-less evenly convex (Fig. 31); longitudinal costae of mesosomal dorsum strongly defined, essentially straight and unbroken, relatively with little intervening microsculpture (Fig. 32) ..... *D. wilsoni* n.sp.

4(2) *a* Smaller species, HW 0.70–0.96 mm, HL 0.87–1.07 mm; eyes smaller, subequal in diameter to width of apical antennomere, and with about 19 to 23 distinct facets; body hairs spectacularly long and abundant (Figs. 16–18). (The only *Dacetinops* species known from peninsular Malaysia; widespread also in Borneo) ..... *D. cirrosus* n.sp.

b Larger species, HW 0.98–1.10 mm, HL 1.11–1.22 mm; eyes larger, with about 30 to 40 distinct facets, and maximum diameter clearly exceeding width of apical antennomere; body hairs generally somewhat shorter

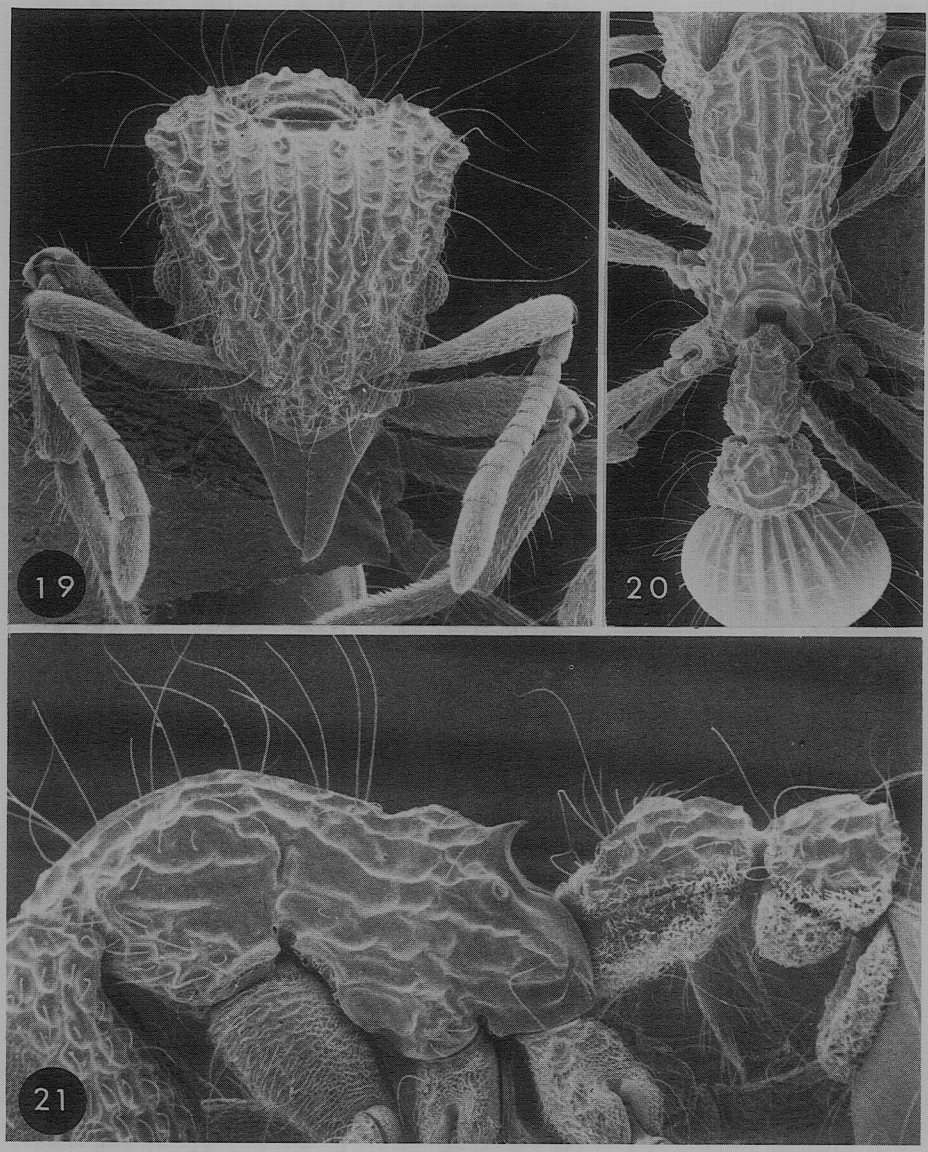


Figures 16–18. Dacetinops cirrosus, holotype worker, standard views. HW 0.85 mm; Pronotum width 0.68 mm; WL 1.24 mm.

and considerably less numerous (Figs. 19–21). (Known only from Borneo; widespread there). ..... *D. concinnus* Taylor

5(1) *a* Propodeal spines distinctly developed (Fig. 15); antennal scapes short, SI 64–66 ..... *D. cibdelus* Brown & Wilson

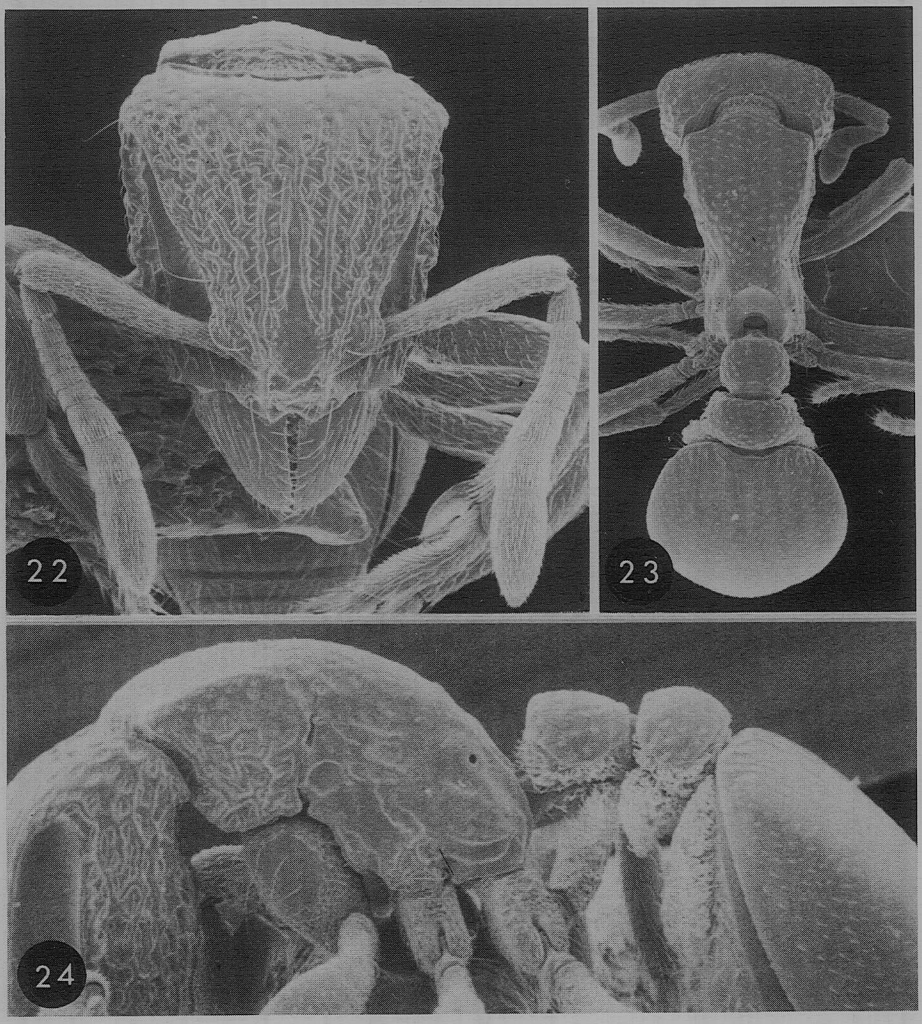
b Propodeal spines lacking, or at most present as minute vestiges (Figs. 24, 27); antennal scapes longer, SI 72–75 6



Figures 19–21. Dacetinops concinnus, worker, Quoin Hill, Sabah, standard views. HW 1.0 mm; Pronotum width 0.70 mm; WL 1.48 mm.

6(5) *a* Posterior portion of head and entire dorsum of body smooth, with scattered punctae; lacking longitudinal costae except for vestiges at the gastral base (Figs. 22–24) ..... *D. darlingtoni* n.sp.

b Head and body tagmata massively sculptured; predominantly with strong longitudinal costae, as usual in *Dacetinops* (Figs. 25–27) ..... *D. ignotus* n.sp.

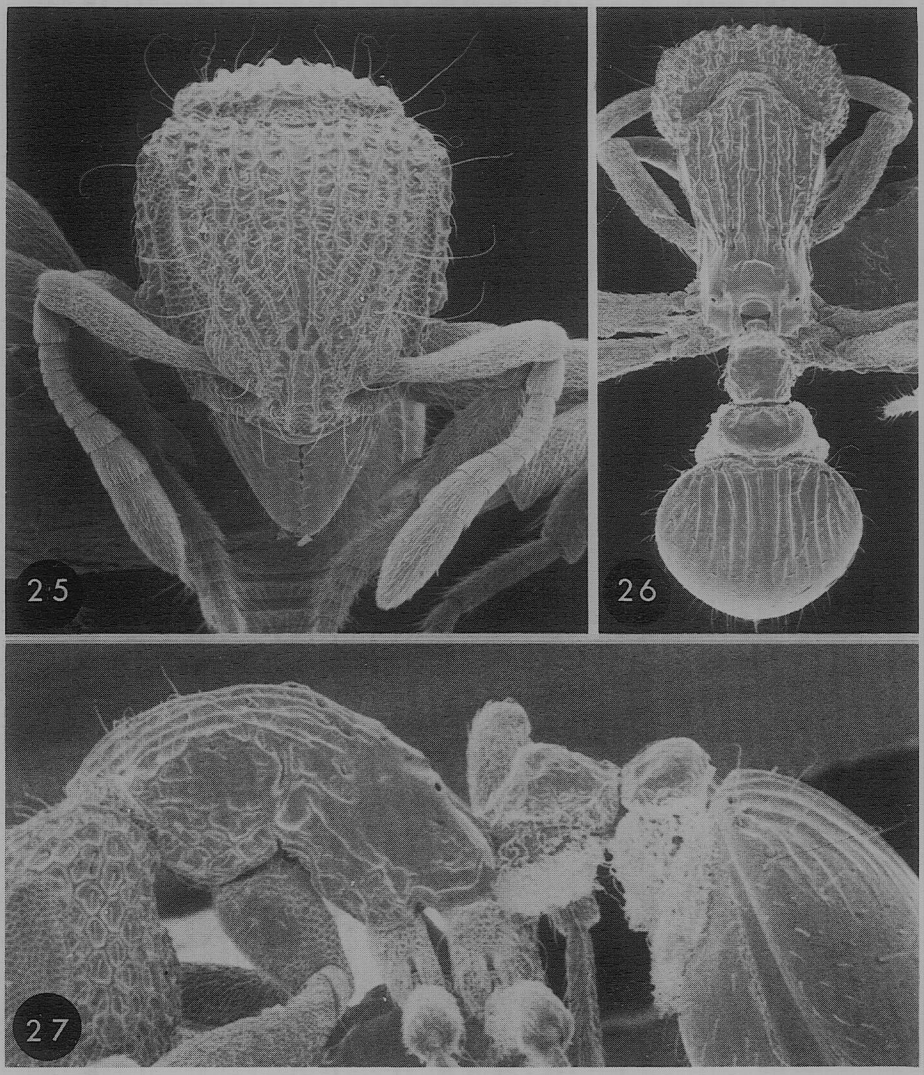


Figures 22–24. Dacetinops darlingtoni, holotype worker, standard views. HW 0.61 mm; Pronotum width 0.44 mm; WL 0.84 mm.

***Dacetinops cibdelus* Brown and Wilson (Figs. 13–15)**

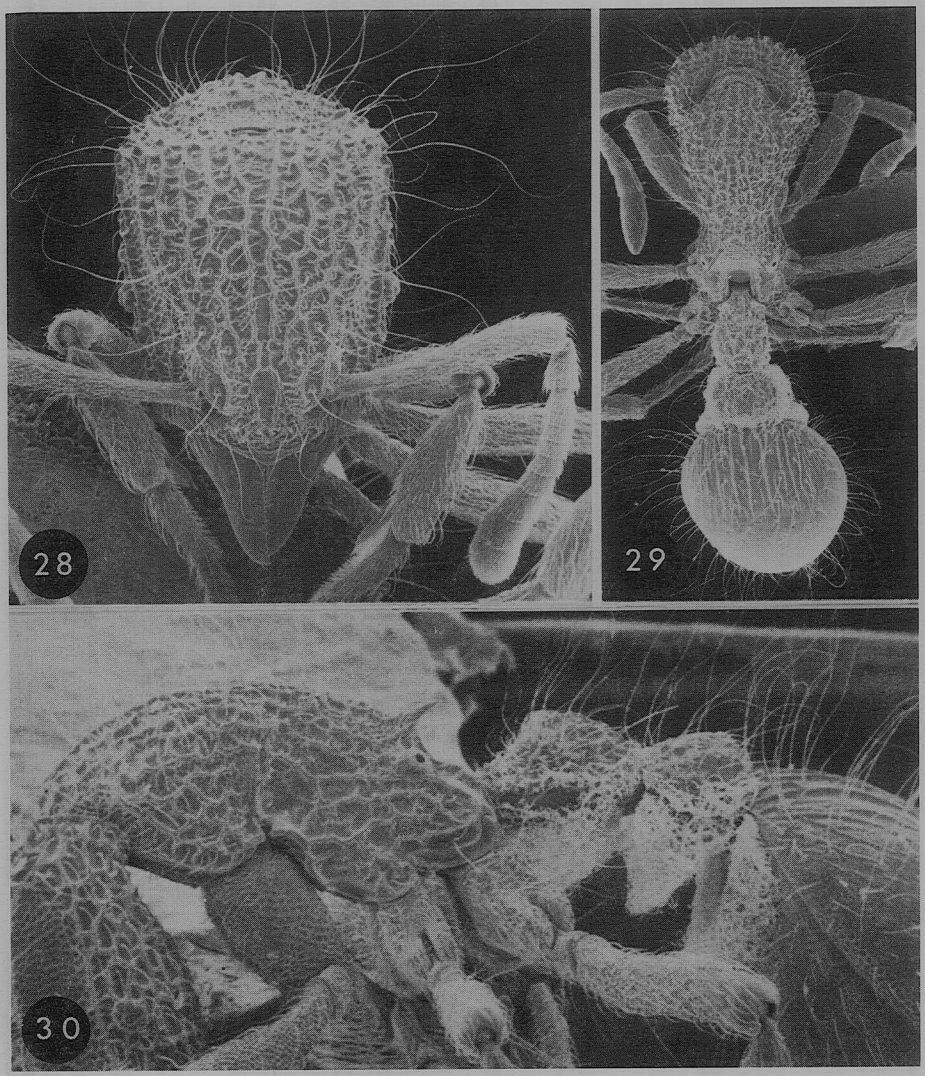
Dacetinops cibdela Brown and Wilson, 1957, p. 4, figs. 1–3, worker, female. Type locality: PAPUA NEW GUINEA: *Lower Busu River,* near Lae (6°43′ S., 147°01′ E.). Holotype in MCZ (examined).

Distribution, material examined. Known from various localities north of the main axial cordillera of New Guinea, eastwards from near Madang (5°13′S., 145°48′ E.) to just south ot Kokoda (8°52′ S., 147°45′ E.). Ecology of the type-locality is



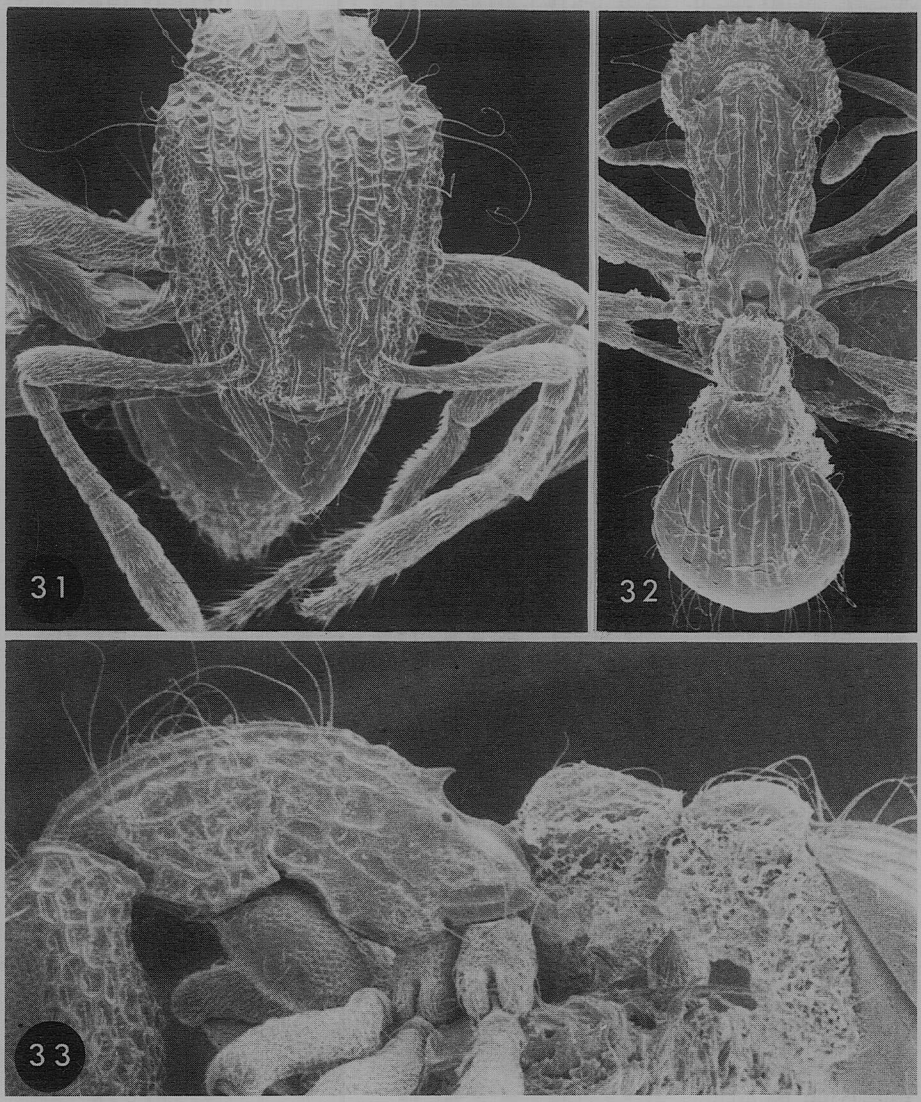
Figures 25–27. Dacetinops ignotus, holotype worker, standard views. HW 0.60 mm; Pronotum width 0.44 mm; WL 0.78 mm.

discussed by Wilson (1958, 1959). I have seen the following additional material. PAPUA NEW GUINEA: MADANG PROVINCE: *Mt Hanseman,* 3 workers, (L. Biró, 1901, HNM, ANIC). *Stephansort* (= Bogadjim) worker, dealate female, (L. Biró 1898, HNM). MOROBE PROVINCE: *Bulolo,* dealate female with larva and worker pupa, 'red-rotten' log, 2800 ft (BBL, 1.i.1971). *c. 16 km NW. of Lae* ('Timber Track'), 3 dealate females, 21 workers, in 4 berlesates, *c.* 220 m (RWT, 12.vi.1972, ANIC berlesates 392–4). *Near Lae*: 400 ft above Bumpu Creek; 2 workers, leaf litter (BBL, 5.i.1968); 7 workers in 2 berlesates, *c.* 50 m (RWT,



Figures 28–30. Dacetinops solivagus, holotype worker, standard views. HW 0.54 mm; Pronotum width 0.44 mm; WL 0.83 mm.

11–16.v.1972, ANIC berlesates 391,400). *N. of Wau,* on Bulolo Rd., 650 m (S. Peck, berlesate B–278, 1974, MCZ, BMNH, ANIC). *Wau,* 4000 ft (S. Peck, 1.vii.1974, MCZ). CENTRAL PROVINCE: *near Kokoda,* 3 dealate females, 19 workers, in 4 berlesates, *c.* 500 m (RWT, 1.vi.1972, ANIC berlesates 384–5, 387–8). *8 km S. of Kokoda,* 4 dealate females, *c.* 35 workers, in 4 berlesates, *c.* 800 m (RWT, 1, 8.vi.1972, ANIC berlesates 381–3, 389). All post–1901 samples are labelled 'rain forest'. Unless otherwise noted all series are represented in the ANIC, with duplicates dispersed elsewhere.



Figures 31–33. Dacetinops wilsoni, holotype worker, standard views. HW 0.58 mm; Pronotum width 0.43 mm; WL 0.81 mm.

Worker. – General features as in Figures 13–15 and key couplets 1*b* and 5*a* above. Dimensions as in Table 1. Further characterization of *D. cibdelus* is unnecessary, apart from details of comparison given below under *D. darlingtoni* and *D. ignotus*.

Female. – Adequately described by Brown and Wilson (1957). The smallest and largest known specimens (from 8 km W. of Kokoda and Bulolo) have the following dimensions: HL 0.57, 0.66; HW 0.55, 0.63; CI 96, 95; ML 0.17, 0.18: MI 30, 27; SL 0.35, 0.41; SI 64, 65; WL 0.79, 0.90. Palpal formula (dissected) *maxillary 2: labial 2*. Some comparative details are given below under *D. ignotus* and *D. wilsoni*.

Relationships. – *D. cibdelus* appears to be the most structurally conservative New Guinean *Dacetinops* species. Both *D. ignotus* and *D. darlingtoni* can readily be derived from *cibdelus*-like stock. *D. ignotus* is closely similar to *cibdelus*, differing mainly in its lack of propodeal spines (Figs. 25–27), a character state present also in *darlingtoni* (Fig. 24). Propodeal spines are represented as minute vestiges in some *ignotus* specimens; their absence in others clearly evidences an evolutionary loss. *D. darlingtoni* resembles *ignotus* in habitus, but differs sharply from it (and from all other *Dacetinops* species) because of its uniquely reduced sculpturation and pilosity (Figs. 22–24). Vestiges of costular elements more typical of *Dacetinops* are present in the *darlingtoni* holotype, demonstrating that its overall sculptural condition is derived. The three New Guinean species form a likely phyletic sequence: *cibdelus-ignotus-darlingtoni*.

The Bornean *D. wilsoni* is similar to *cibdelus* (compare Figs. 13–15 and 31–33), a resemblance linking the New Guinean and Bornean species. *D. wilsoni* in fact seems closer to *cibdelus* than to its Bornean associates, which could be dervied from *wilsoni*-like stock.

Bionomics. – Apparently nests in rotting logs and smaller decaying wood fragments on the floor of lowland and mid-montane rain forest, and forages in leaf litter on the ground. Most records are from Berlese funnel extracts of leaf mould. The known range of the species encompasses that of its genus on New Guinea. It is closely sympatric with both *D. ignotus* and *D. darlingtoni* in the Popondetta-Kokoda area (see below under *D. ignotus)*.

***Dacetinops cirrosus* new species (Figs. 1, 16–18)**

Type locality. – SARAWAK : FIRST DIVISION : *Semengo Forest Reserve, c.* 19 km SW. of Kuching (1°33′ N., 110°20′ E.) (*c.* 2 km S. of 10th mile Bazaar, on Kuching-Penrissen Road).

Distribution, material examined. – Known from West Malaysia and Malaysian

Borneo, eastwards from Trengganu (5°20′ N., 103°07′ E.) on the central western peninsula, to near Tawau (4°15′ N., 117°54′ E.) in south-eastern Sabah. WEST MALAYSIA : TRENGGANU (whether the state or city is not specified), dealate female, 5 workers (T. Clay, 1974, BMNH, ANIC). JOHORE : *Gunong Pulai,* 2 workers, rotting log, 500 ft (RWT, 22. v. 1968). SARAWAK : FIRST DIVISION : *Semengo Forest Reserve,* holotype, nidoparatype dealate female, 4 nidoparatype workers, and brood, nest in rotting branch on ground (RWT, acc. 68.121, 28.v.). FOURTH DIVISION : *Gunong Mulu National Park:* worker, leaf litter (H. Vallade, 14.iii. 1978, BMNH); 4 workers (J.S. Marshall, v–vii. 1978, BMNH, ANIC). SABAH : *Lungmanis, mile 45* (Labuk Rd., ex. Sandakan); colony, small rotting log, (RWT, acc. 68.462, 12.vi.); worker under bark on log (RWT, acc. 68:459). *Lungmanis, mile 43* (Labuk Rd.), colony, small piece of rotting wood (RWT, acc. 68.503, 13.vi.). *Sepilok Forest Reserve,* near Sandakan : colony, small rotting log (RWT, acc. 68.425, 11.vi.); 2 workers, berlesate (RWT, acc. 68.451, 12.vi). *Quoin Hill Research Station,* near Tawau : 2 colonies, small rotting logs (RWT, acc. 68.532, 17.vi.; acc. 68.599, 19.vi.); 2 workers, berlesates (RWT, accs. 68.619, 68.621, 19.vi.). All RWT series from rain forest; others not specified. Contents of colony series are reviewed below. I have also seen a dealate female from Quoin Hill collected on 5.viii. 1962 by Y. Hirashima (BISHOP). The Trengganu and Johore specimens could represent a sibling species separate from *cirrosus* (see below). For this reason Type designation has been restricted to Bornean specimens *only*.

Type deposition. – Holotype and most paratypes in ANIC (type No. 7545). Paratypes in BISHOP, BM(NH), GM, HNM, KUB, MCZ, SAR and elsewhere.

Worker. – General features as in the accompanying figures and appropriate sections of key complets 1*a*, 2*b* and 4*a* above. Dimensions as in Table 1. Closely resembling *D. concinnus* Taylor; differing from it as follows:

1. Smaller size: HL in Bornean samples of *cirrosus* 0.87–1.02 mm (*versus* 1.11–1.22 mm in *concinnus)*, HW 0.70–0.85 mm (*vs.* 0.98–1.10 mm), WL 1.05–1.24 mm (*vs.* 1.42–1.61 mm). The available West Malaysian *cirrosus* specimens are larger than Bornean examples (HL 0.98–1.07 mm, HW 0.85–0.96 mm, WL 1.21–1.35 mm).
2. Different proportions: Bornean specimens of *cirrosus* compared to *concinnus*, have proportionately narrow heads (CI 80–85 *vs.* 88–91), shorter mandibles (MI 28–30 *vs.* 30–32), and longer scapes (SI 75–81 *vs.* 68–69). Specimens from peninsular Malaysia are, however, closer to *concinnus* in proportions (CI 87–90, MI 29–30, SI 68–69).
3. Smaller eyes: those of Bornean *cirrosus* have 19–23 distinct facets, with 5 or 6 spanning their diameter; *concinnus* has 32–40, with 7–8 spanning the longest diameter. Viewed in elevation the eyes of *cirrosus* are almost circular in outline; those of *concinnus* are elliptical. The maximum eye diameter in

Bornean *cirrosus* specimens is about equal to the width of the apical antennomere, while in *concinnus* the eyes are 1.2 to 1.3× as long as the apical antennomere is wide (these statements have been carefully checked, using an eyepiece measuring scale). The eyes of peninsula *cirrosus* specimens do not differ significantly from those of Bornean examples.

4. The flagellate head and body hairs are longer and more abundant in *cirrosus*. Counting is difficult, but *D. concinnus* workers have about 30 hairs on the first gastral tergite, and many remain after 30 are counted in *D. cirrosus*..
5. Other differences between these species are illustrated in Figures 16–18 and 19–21. In particular the sculptural costae of *concinnus* are more pronounced and regular, with fewer lateral spurs than in *cirrosus* (compare cephalic sculpture in Figs. 16 and 19; dorsal mesosomal sculpture in Figs. 17 and 20). The spongiform masses on the petiole and postpetiole are more compressed and relatively small in *concinnus*. Also, they are cream in color, versus golden-yellow in *cirrosus*. Body color almost identically reddish brown in both species; the legs and antennae a shade lighter. The *cirrosus* palpal formula (dissected) *maxillary 2: labial 2*.

Female. – The smallest and largest Bornean specimens (from Lungmanis mile 45 and Semengo) have the following dimensions (mm): HL 0.97, 1.03; HW 0.81, 0.88; CI 84, 85; ML 0.28, 0.32; MI 29, 31; SL 0.61, 0.66; SI 75, 75; WL 1.27, 1.40; palpal formula *maxillary 2: labial 2*. The Trengganu female, like West Malaysian workers, is larger than Bornean specimens: HL 1.14; HW 1.06; CI 92; ML 0.37; MI 32; SL 0.69; SI 65; WL 1.53. Similar to the workers in appropriate features. Wing venation as in Figure 1. Additional notes below, under *D. concinnus* and *D. wilsoni*.

Male. – Known from a single adult (ANIC) from a nest at Quoin Hill (acc. 68.599). General features as in *D. concinnus,* described below. Comparison of the two species is given at that point. Wing venation as in female.

Relationships. – *D. cirrosus* is essentially a small, gracile version of *D. concinnus*. The two species are doubtless related, and probably cognate. Their broadly sympatric distribution on Borneo is notable. The relatively large size and *concinnus*-like proportions of *cirrosus* specimens from Trengganu and Johore could result from ecological release in the absence of sympatric *D. concinnus* populations, though it is premature to conclude that *concinnus* is not present on mainland Malaysia.

Bionomics. – Sympatric with the three other known Bornean *Dacetinops* species at Semengo, and with all except *D. wilsoni* less in Sabah. *D. cirrosus* nests in rotting wood and logs on the rain forest floor, and evidently forages cryptically in leafmould. The type nest series of both *D. cirrosus* and *D. wilsoni* were collected

from the same rotting branch on the ground. Colonies at Semengo in May, and at Quoin Hill in June, contained eggs, small larvae, large almost mature larvae, and pupae. The latter included advanced workers at Semengo on 28–31 May, and almost mature male pupae, with one emerged adult, at Quoin Hill on 19 June. Male pupae when present were more advanced than associated worker pupae. Alate females were present with callow workers in nests at Lungmanis mile 45 on 12–13 June; the accompanying larvae were all small, apparently coeval, and not part of the cohort which produced the young adults.

***Dacetinops concinnus* Taylor (Figs. 2–6, 10–12, 19–21)**

Dacetinops concinna Taylor, 1965, p. 1, Figs. 1–2, worker. Type-locality: western SARAWAK, *Nanga Tekalit Camp* (1°38′ N., 113°35′ E.). Holotype in MCZ (examined).

Distribution, material examined. – Known only from Borneo. Widespread there, ranging from the type-locality, northeast to near Sandakan (5°50′ N., 118°07′ E.) in eastern Sabah, and southeast to near Batulitjin (3°26′ S., 116°00′ E.) in Indonesian Kalimantan. The types were taken at a rain forest research camp established by the Chicago Field Museum of Natural History; its ecology has been described by Inger and Greenberg (1966). I have subsequently collected the following series, all in rain forest: SARAWAK : FIRST DIVISION : *Semengo Forest Reserve,* 19 km SW. of Kuching, stray worker from tangled rotting sticks on ground, treefall clearing (acc. 68.168, 30.v.). SABAH : *Lungmanis, mile 45* (Labuk Rd., ex. Sandakan): 2 stray workers on large rotting log (68.522, 13.vi.); dealate female, stray on surface of large rotting log (68.469, 12–13.vi.). *Quoin Hill Research Station,* near Tawau; 4 colony series, ex rotting logs (68.530, 68.531, 68,571, 68.582, 16–18.vi.); surface strays from rotting logs (68.533, worker; 68.600, dealate female, 16–18, vi.). Contents of colony series are reviewed below. Material examined elsewhere includes a worker labelled 'North Borneo (S.E.), forest camp *19 km N. of Kalabakan,* 180 m, Y. Hirashima' (BISHOP). Coordinates for Kalabakan are 4°25′ N., 117°29′ E. I have seen the following specimens in the MCZ collection : SARAWAK : FOURTH DIVISION : *Gunong Mulu National Park,* 8 workers, rotten log, lowland rainforest (B. Bolton, 5.x.1977). INDONESIA : KALIMANTAN SELATAN : *17–46 km W. Batulitjin,* lowland rain forest (W.L. Brown, 28.vi.1972). Other specimens from Gunong Mulu are in the BM(NH) and ANIC.

Worker. – General features as in accompanying figures and appropriate sections of key couplets 1*a*, 2*b* and 4*b* above. Dimensions as in Table 1. Further characterization is unnecessary. Some comparative details are given above under *D. cirrosus*.

Female. – The smallest and largest known females of *concinnus* (from Quoin Hill and Lungmanis mile 45) have the following dimensions (mm): ML 1.20, 1.20; HW 1.07, 1.08; CI 89, 90; ML 0.36, 0.37; MI 30, 31; SL 0.72, 0.75; SI 67, 69; WL 1.62–1.64; palpal formula (dissected) *maxillary 2 : labial 2.* Similar to workers in appropriate features. Larger than *D. cirrosus* females, with different proportions; wing venation identical (as in Fig. 1). Additional notes below, under *D. wilsoni.*

Male. – General features as in Figures 10–12. Dimensions (mm; the illustrated specimen alone has been measured): HL 0.75; HW (across eyes) 0.81; scutum width 0.71; WL 1.33; palpal formula (dissected) *maxillary 2 : labial 2.* Mandibles narrow, edentate, inner and posterior borders forming an even curve, outer borders broadly convex. Clypeal disc strongly convex, anterior border entire, with a narrow translucent apron. Eyes large (maximum diameter 0.31 mm), finely faceted, with scattered short hairs, each about as long as average facet diameter. Frons without ocellar protuberance. Antennal proportions as illustrated. Scape short, about 2.5× as long as wide; pedicel short, about as long as wide. The two apical flagellar segments elongate, apical longest; preceding six segments shorter, those in middle of series shortest; the three basal flagellar segments (antennal 3–5) fused, forming a long secondary joint, the fusion points (arrowed in Fig. 10) feebly constricted, without sutures, the distalmost very distinct. (All 13-segments of the primitive male formicid antenna are thus accounted for.)

Postcephalic structure as illustrated; notaulices and parapsidal furrows distinct; no trace of metapleural gland opening or bulla, or of spongiform masses on the waist nodes. Wings as in *D. cirrosus* (Fig. 1). Foreleg with calcar and strigil; middle and hind tibiae without spurs; tarsal claws simple (the ovoid body on the hind coxa in Fig. 12 is foreign).

Terminal abdominal sclerites as in Figures 2 and 3, unspecialized, cerci discerned only after dissection. Genital capsule as in Figures 4–6, the whole very lightly sclerotized. Basal Ring (gonobase; section 1 of IX gonocoxites) entire, strongly narrowed at ventral midline, where a broad flap bearing the gonocondylar apodeme is reflexed postero-ventrally towards the genitalic apex; foramen large. Gonoforceps (sections 2 of IX gonocoxites) simply digitate, each with a mesally directed, broadly triangular ventral lobe. Volsellar cuspis apparently lacking; digitus strongly laterally compressed, very thin in dorsal view (Fig. 4), hook-shaped (Fig. 6), its apex weakly clubbed. Penis valves (IX gonapophyses) weakly sclerotized, outline simple (Fig. 6), ventral border weakly and finely toothed.

Sculpuration and pilosity as illustrated; gastral sclerites relatively smooth and shining. Color dark brown, almost black.

Comparison between males of *D. concinnus* and *D. cirrosus* implies that the above description, apart from measurement details, can be provisionally accepted as a generic diagnosis. The specimens are almost identical, even to details

of antennal structure. The mandibles of *cirrosus* are more linear and falcate; the propodeum bears weak, obtuse, vestigial spines; the petiole is relatively a little longer and broadly inflated beneath anteriorly; the ventral processes of the gonoforceps are less pronounced; and the digiti more falcate than hooked, with their apices barely expanded. Dimensions of the sole paratype male *cirrosus* are: HL 0.65; HW (across eyes) 0.68; scutum width 0.64; WL 1.18; palpal formula (dissected) *maxillary 2 : labial 2;* wings as in female (Fig.1); color medium dark brown (the specimen slightly callow).

Relationships. – See above under *D. cirrosus. Concinnus* and *cirrosus* seem to be closely related, and could be derived from more conservative stock resembling *D. cibdelus* and *D. wilsoni.*

Bionomics. – Nesting and foraging habits apparently as in *D. cirrosus.* Nests or stray workers have been collected from rotting wood fragments, small trunk logs, and a huge rotten log at Quoin Hill, *c.* 10 m long and 2 m in diameter (acc. 68.530). Sympatric at Semengo with *D. cirrosus, D. solivagus* and *D. wilsoni,* and in Sabah with the first two. Colonies at Quoin Hill on 16–19 June contained larvae in two cohorts (some very small, others nearing maturity), pupae at all stages, including workers, females and males, and adult alate females, males and workers, some of them callow. Eggs were not observed.

***Dacetinops darlingtoni* new species (Figs. 22–24)**

Type locality. – PAPUA NEW GUINEA : NORTHERN PROVINCE : *near Kokoda* (8°52′ S.,147°45′ E.).

Material examined. – Known only from the holotype, taken in a berlesate of rain forest leaf mould at elevation *c.* 500 m (R.W. Taylor, 1.vi.1972, ANIC berlesate 385). Several *Dacetinops cibdelus* workers were in the same sample.

Holotype deposition. – In ANIC (type No. 7546). The specimen has been gold-palladium coated for scanning electron microscopy.

Worker. – General features as in accompanying figures and key couplets 1*b*, 5*b* and 6*a* above. Dimensions as in Table 1. Habitus like *D. cibdelus* Brown and Wilson and *D. ignotus* Taylor, n. sp. (compare Figs. 22–24 with 13–15, and 25–27). The following features distinguish *D. darlingtoni*:

1. Larger than *cibdelus* (HL 0.70 mm, HW 0.61 mm, *vs* 0.54–0.64 and 0.50–0.59 mm); the antennal scapes proportionately long (SI 72 *vs.* 64–66).
2. Anterior clypeal margin medially emarginate, lacking a translucent apron.
3. Posterior parts of antennal foveae in frontal view obscured by anterior scrobes.

4. Propodeal spines lacking, as in *D. ignotus*.
5. Sculpturation extremely reduced, as illustrated. The costulation otherwise characteristic of *Dacetinops* species represented only by traces on the frons, underside of head, and sides of mesosoma, and by weak vestiges of longitudinal ribs at the base of the first gastral tergite (abdominal IV). Mandibles striate, shagreening of antennal foveae and legs vestigial, the foveae essentially smooth and shining.
6. Pilosity extremely reduced, a few small hairs on mandibles, clypeus, frons, dorsal antennal scrobes, legs and underside of gaster. The hairs of the antennal scrobes are bilaterally paired and match their apparent homolgs in *D. cibdelus*, evidencing the derived nature of the reduced *darlingtoni* pilosity. Other features of this very distinctive species as illustrated. Color as in other species of *Dacetinops*, reddish brown; the mandibles, antennae and legs a shade lighter. Palpal formula (dissected) *maxillary 2: labial 2.*

Relationships. – Discussed above under *D. cibdelus.*

Bionomics. – Discussed below under *D. ignotus.*

***Dacetinops ignotus* new species (Figs. 25–27)**

Type locality. – PAPUA NEW GUINEA : NORTHERN PROVINCE : *8 km S. of Kokoda* (near northern terminus of the 'Kokoda Trail', which crosses the Owen Stanley Range to Bisianumu and Port Moresby; estimated coordinates 8°57′ S., 147°43′ E.).

Distribution, material examined. – Known only from the Popondetta-Kokoda area of eastern New Guinea. PAPUA NEW GUINEA : NORTHERN PROVINCE : *Kokoda,* 2 workers (P.M. Room, 6.iv.1972). *Near Kokoda,* worker, berlesate, c. 500 m (RWT, 1.vi.1972). *8 km S. of Kokoda,* holotype worker, 3 additional workers, 2 dealate females, *c.* 800 m (RWT, 8.vi.1972; ANIC berlesates 382,389). *Popondetta,* 3 workers (P.M. Room, 6, 15.ii.1972). *Near Popondetta,* worker, <50 m (RWT, 31.v.1972, ANIC berlesate 380). *Near Dobodura,* on Samboga River, worker, stray on rotten log, 100 ft (BBL, 14.i.1971). All samples from rain forest; all specimens designated as types.

Type deposition. – Holotype and most paratypes in ANIC (type No. 7547). Paratype workers in BM(NH), GM, and MCZ. Holotype gold coated, mounted with a color-matched paratype.

Worker. – General features as in the accompanying figures and key couplets 1*b*,

5*b* and 6*b* above. Dimensions as in Table 1. Habitus and color close to *D. cibdelus* Brown & Wilson. The following features characterize *D. ignotus*:

1. Available specimens approximately intermediate in size between those of *D. cibdelus* and *D. darlingtoni* (Table 1), the scapes proportionately longer than in *cibdelus* (SI 72–75 *vs.* 64–66).
2. Propodeal spines essentially lacking; at maximum development reduced to minute vestiges no higher than the sculptural costae of the mesosomal dorsum.
3. Inter-costular spaces of head and mesosoma with more distinct microsculpture than in *D. cibdelus*; petiole with microsculpture, but lacking distinct vestigial costae; postpetiole less distinctly sculptured (compare Figs. 13–15 with 25–27).
4. Pilosity relatively somewhat reduced; cephalic hairs much as in *cibdelus*, those of body shorter and reduced in number, the differences most distinct on the gaster.

   Palpal formula (dissected) *maxillary 2: labial 2.*

Female. – With the usual worker-female differences. Similar to *D. cibdelus* but propodeal spines vestigial and microsculpture more prominent, as in the workers. Head width of the two available specimens is 0.60 and 0.61 mm; the largest has the following other dimensions (mm): HL 0.65; CI 94; ML 0.19; MI 29; SL 0.41; SI 67; WL 0.85. Additional notes below, under *D. wilsoni.*

Relationships. – Discussed above under *D. cibdelus.*

Bionomics. – Almost all specimens are from rain forest leaf mould berlesates, the one other from a rotting log in rain forest. *D. cibdelus* was present also in most of these samples, including that with the *ignotus* holotype. The *D. darlingtoni* holotype was taken, with *cibdelus*, in a berlesate gathered near one with an *ignotus* worker. The three New Guinea *Dacetinops* species are thus closely sympatric in the Popondetta-Kokoda area. It appears that the new species have habits similar to *D. cibdelus* (see above).

Dacetinops solivagus **new species (Figs. 28–30)**

Type locality. – SARAWAK: FIRST DIVISION : *Semengo Forest Reserve, c.* 19 km SW. of Kuching (1°33′ N., 110°20′ E.) (*c.* 2 km. S. of 10th mile Bazaar on Kuching-Penrissen Road).

Distribution, material examined. – Known only from four specimens, all collected by the author in 1968 from berlesates of rain forest leaf mould. SARAWAK : *Semengo Forest Reserve,* holotype worker, paratype worker, paratype female (Accs. 68.779, 2.vii.; 68.260, 22.vi.; 68.778, 30.vi.). SABAH : *Quoin Hill Research Station,* near Tawau (4°16′ N., 117°54′ E.) paratype worker (65.619, 19.vi.).

Type deposition. – All in ANIC (type No. 7548). Holotype gold coated, originally colored like paratypes. Semengo paratype worker badly damaged.

Worker. – General features as in accompanying figures, and key couplets *1a*, *2a* and *3a*. Dimensions as in Table 1. This very distinctive species may be diagnosed as follows:

1. Small size (HL 0.73–0.80 mm, HW 0.54–0.59 mm), with exceedingly narrow, almost parallel-sided head, and relatively very long scapes (CI 74–75 SI 90–91; *vs.* 80–94 and 66–81 respectively in other *Dacetinops* species. Additional notes below, under *D. wilsoni.*
2. Distinctive sculpturation: Longitudinal costae of head and mesosomal dorsum less clear-cut and elevated than in other species; their crests wavy, sometimes broken, and with many strong lateral spurs, supplemented by relatively coarse microsculpture in the intervening spaces; these elements all contributing to a generally rugose appearance. Mandibles smooth and shining; sides of mesosoma rugose and microsculptured, lacking smooth shining areas; waist nodes opaque, microsculptured; striae of first gastral tergum distinctive, as illustrated in Figure 29.
3. Relatively pilose, as illustrated.

In addition, the mandibles are similar in shape to those of *D. cirrosus* and *D. concinnus*, the eyes small, and the propodeal spines well developed. Palpal formula (dissected) *maxillary 2: labial 2.* Color as usual for the genus.

Female. – Distinguished from other species by the same features as the worker. Dimensions (mm): HL 0.78; HW 0.61; CI 78; ML 0.21; MI 27; SL 0.52; SI 85; WL 0.99. Additional notes below under *D. wilsoni.*

Relationships. – *D. solivagus* stands apart from all other *Dacetinops* species. The mandibular structure could relate it to *D. cirrosus* and *D. concinnus*, and like them it could be derived from stock resembling *D. wilsoni,* and ultimately *D. cibdelus* (see notes below under *D. wilsoni*).

Bionomics. – Probably much as in other small *Dacetinops* species; all specimens are from Berlese funnel samples, indicating activity in or on leaf litter. Sympatric with all known Bornean *Dacetinops* species at Semengo, and with all except *D. wilsoni* at Quoin Hill, where *D. cirrosus* was taken with *D. solivagus* in Acc. 65.619.

***Dacetinops wilsoni* new species (Figs. 7–9, 31–33)**

Type locality. – SARAWAK : FIRST DIVISION: *Semengo Forest Reserve, c.* 19 km SW.

of Kuching (1°33′ N., 110°2′ E.) (*c.* 2 km S. of 10th mile Bazaar, on Kuching-Penrissen Road).

Distribution, material examined. – Known only from lowland rain forest at the type-locality. Collected by RWT in 1968 as follows: holotype worker, 40 nidoparatype workers, nidoparatype dealate female and brood, nesting in 1.2 m long × *c.* 10 cm diameter well rotted branch on the ground (acc. 68.122/123, 28.v.); paratype worker, leaf mould berlesate (acc. 68.259, 1.vi.).

Type deposition. – Holotype and most paratypes (including female) in ANIC (type No.7549). Worker nidoparatypes in BISHOP, BM(NH), GM, HNM, KUB, MCZ, SAR and elsewhere. Holotype and nidoparatype female gold coated for microscopy, mounted with uncoated color matched workers.

This species is named for Professor Edward O. Wilson of Harvard University.

Worker. – General features as in Figures 31–33 and key couplets 1*a*, 2*a*, and 3*b* above. Dimensions as in Table 1. General form of head and mandibles like *D. cibdelus* Brown and Wilson; post-cephalic habitus more like *D. solivagus* n.sp. The following features characterize *D. wilsoni*:

1. Small size (HL 0.68–0.74 mm, HW 0.55–0.61 mm); head relatively narrow (CI 81–82); scapes moderately long (SI 79–80); eyes small; propodeal spines present.
2. Mandibles distinctive among known Bornean *Dacetinops*; like those of New Guinean species: outer borders broadly convex; frontal surfaces strongly striate (Fig. 31). Other Bornean mandibles are smooth, unsculptured, with partly concave outer borders (e.g. *D. solivagus*, Fig. 28).
3. Head shape quite different from *D. cirrosus*, *D. concinnus*, or *D. solivagus*; resembling the apparently more conservative New Guinea species.
4. Sculpturation as illustrated: generally much as in *D. cirrosus* and *D. concinnus*; microsculpture more pronounced, especially on sides of pronotum (compare Fig. 33 with Figs. 18 and 21). Basigastral costae (Fig. 32) less regular than in *cirrosus* and *concinnus* (Figs. 17, 20); less disrupted than in *solivagus* (Fig. 29).
5. Pilosity as illustrated: long hairs about as in *D. concinnus*, less abundant than in *D. cirrosus* and *D. solivagus*.

Palpal formula (dissected)*Maxillary 2 : labial 2.* Color as in other *Dacetinops* species, at least in the darker specimens; most of the types are lighter reddish brown, and apparently have not attained full coloration.

Female. – Known only from one nidoparatype. General features as in Figures 7–9. Dimensions (mm); HL 0.76; HW 0.65; CI 84; ML 0.22; MI 29; SL 0.51; SI 80; WL 1.00. Distinguished from workers by the usual caste differences, otherwise similar.

Females are known for all *Dacetinops* species except *D. darlingtoni.* All agree

with the generic diagnosis of Brown and Wilson (1957:2). HW measurements and values for CI and SI are generally high in the conspecific worker ranges, or higher; SI values low or lower. Basic mesosomal structure similar throughout; wing venation known for *D. cirrosus* and *D. concinnus*, as in Figure 1; ocelli proportioned as in Figure 7 or relatively slightly smaller; palpal formula *2:2* in three species dissected.

Females follow conspecific workers in general details of head and mandibular form, antennal structure, status of propodeal spines, development of spongiform masses on waist nodes, and the nature of the micro- and macrosculpture, pilosity and color.

Relationships. – The mandibular shape and sculpture, and the general form of the head, appear to relate *D. wilsoni* to the New Guinean *Dacetinops* species (compare Figs. 25 and 31). *D. cibdelus* is the most conservative of these, and is perhaps the least derived of all known members of the genus. The *wilsoni* head is, however, proportionately narrow (CI 81–82 *vs.* 87–94 in New Guinea species), grading towards the extreme of *D. solivagus* (CI 74–75). In addition the post-cephalic habitus of *wilsoni* is close to that of *solivagus* (compare Figs. 32–33 and 29–30), and the development of inter-costal microsculpture on the head and mesosoma, and disruption of the basigastral costae in *wilsoni* appear to foreshadow the *solivagus* condition. Thus, *cibdelus*, *wilsoni* and *solivagus* could reflect a phyletic sequence.

The larger Bornean species *D. cirrosus* and *D. concinnus* appear also to be derived from more conservative *cibdelus*- or *wilsoni*-like stock. They have mandibles like those of *solivagus* (compare Figs. 26, 16 and 19). possibly indicating a distant relationship to the ancestors of that species.

Bionomics. – Probably much as in other small *Dacetinops* species. The type colony contained larvae, apparently of two broods – some very small, others almost fully grown – and worker pupae representing a full range of developmental stages, from pharate larvae ('prepupae') to almost fully pigmented pharate adults. *D. wilsoni* is sympatric with three other known Bornean *Dacetinops* species at Semengo. The *cirrosus* type-nest series came from the same piece of rotting branch as the *wilsoni* nidoparatypes.

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