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A new coffee aphid predator, with notes on other Oriental species of *Paragus* (Diptera: Syrphidae)

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ABSTRACT. Fourteen Oriental species of *Paragus* Latreille are treated and keyed. The following three species of the subgenus *Paragus s. str.* are described as new: *annandalei* Ghorpadé, sp. nov. (northwest Himalayas), *brachycerus* (Malaya, Java), and *stuckenbergi* (Philippines) Thompson, spp. nov.; and also two species of the subgenus *Pandasyopthalmus* Stuckenberg: *goeldlini* (Timor), and *villipennis* (Malaya, Sumatra, Java) Thompson, spp. nov. *Paragus (Paragus) brachycerus* Thompson, sp. nov. is recorded as a new predator of the coffee aphid, *Toxoptera aurantii* (Boyer de Fonscolombe), from Java, and its puparium figured. Some other new and known prey (and flower) records of *Paragus* spp. are also included. Male terminalia of all new species and of *atratus* de Meijere, *politus* Wiedemann, and *rufocinctus* (Brunetti) are illustrated. Lectotypes are designated for *Paragus atratus* de Meijere, *P. latiusculus* Walker and *P. politus* Wiedemann. *Paragus keiseri* van der Goot is a new junior synonym of *P. politus* Wiedemann. Tentative synonymies are proposed for *Paragus politus* Wiedemann (= ? *Pipizella indica* Brunetti, ? *Paragus rufiventris* Brunetti), and *Paragus rufocinctus* (Brunetti) (= ? *Paragus abrogans* Goeldlin de Tiefenau). *Graptomyza latiuscula* (Walker) (from *Paragus*) is proposed as a new combination. *Paragus quadrifasciatus* Meigen is a new record for the Indian subcontinent and that of *P. bicolor* (Fabricius) from there is confirmed.

Introduction

Paragus Latreille, until recently, was considered a small genus of aphid predators. Only a few widespread species — *bicolor* (Fabricius) (Holarctic), *serratus* (Fabricius) (Palaeotropical) and *tibialis* (Fallén) (Neogaean) — and some rare and restricted ones, were recognised [Palaearctic Region — 14 species (Sack, 1929: 131-138), Nearctic — two species (Wirth *et al.*, 1965: 577-578), Afrotropical — five species (Bezzi, 1915: 11-15), Oriental — four species (Kertész, 1910: 1-8), and Neotropical — one species (Fluke, 1957: 18-19), for a total of 21 species as of the 1950s].

Stuckenberg (1954a, 1954b) revised the Afrotropical and Oriental (*serratus*-group only) species, discovering that the so-called widespread and common species, *serratus* of authors, was a complex of seven species of more restricted ranges. Stuckenberg used male terminalia, wing microtrichia, and body punctation, along with the

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In this paper, the letters 'm' and 'f' are used for male and female, respectively. The abbreviation mt = meters.

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more traditional character of color, to separate these species. The European species were revised through a similar approach by Goeldlin de Tiefenau (1971, 1974, 1976). He, likewise, found that the common and widespread "species", *bicolor* and *tibialis* of authors, were species-complexes. Vockeroth (1986) revised the New World fauna of *Paragus* and showed that *bicolor* (Fabricius) and *tibialis* (Fallén) did not occur there, but that "*bicolor*" of American authors was a complex of seven other species and that "*tibialis*" of American authors was the Holarctic species, *haemorrhous* Meigen. The status of *tibialis* and *bicolor* of authors in the Orient is reviewed here.

The following acronyms are used for depositories cited in this paper, and the names of curators who handled the loans to us are placed in parentheses:

AMNH American Museum of Natural History, New York, U.S.A. (P.W. Wygodzinsky).

ANIC Australian National Insect Collection, Commonwealth Scientific and Industrial Research Organization, Canberra City, Australia (D.H. Colless).

BMNH British Museum (Natural History), London, U.K. (B.H. Cogan and K.G.V. Smith).

BPBM Bernice P. Bishop Museum, Honolulu, Hawaü, U.S.A. (W.A. Steffan).

BPIM Bureau of Plant Industry, Department of Agriculture, Manila, The Philippines (S.J. Bayubay).

CAS California Academy of Sciences, San Francisco, U.S.A. (P.H. Arnaud Jr).

CIBCP Commonwealth Institute of Biological Control, Pakistan Station, Rawalpindi, Pakistan (M.A. Ghani).

CNM Colombo National Museum, Department of National Museums, Sri Lanka (P.H.D.H. de Silva).

CUIC Cornell University Insect Collection, Ithaca, U.S.A. (L.L. Pechuman).

ILRI Indian Lac Research Institute, Namkum, Ranchi, India (R.S. Gokulpure).

IRSNB Institut Royal des Sciences Naturelles dc Bclgique, Brussels, Belgium (P. Vanschuytbroeck).

ITZ Instituut voor Taxonomische Zoölogie, Zoölogisch Museum, Universitcit van Amsterdam, The Netherlands (T. van Leeuwen).

KGC Personal collection of Kumar Ghorpadé, Bangalore, India.

MCSNG Museo Civico de Storia "Giacomo Doria", Genoa, Italy (R. Poggi).

MCZ Museum of Comparative Zoology, Harvard University, Cambridge, U.S.A. (J.C. Scott).

MNHN Museum National d'Histoire Naturelle, Paris, France (L. Matile).

MZL Musee Zoologique, Lausanne, Switzerland (P. Goeldlin de Tiefenau).

NMB Naturhistorisches Museum, Basel, Switzerland (C. Baroni Urbani).

NMW Naturhistorisches Museum Wien, Vienna, Austria (R. Lichtenberg – Contreras).

NRS Naturhistoriska Riksmuseet, Stockholm, Sweden (P.I. Persson).

PLC Personal collection of Pavel Láska, Olomouc, Czechoslovakia.

SEM Snow Entomological Museum, University of Kansas, Lawrence, U.S.A. (G.W. Byers).

TNAU Tamil Nadu Agricultural University, Coimbatore, India (T. Kumaraswami).

USNM U.S. National Museum of Natural History, Smithsonian Institution, Washington, D.C., U.S.A.

UZM Universitetcts Zoologisk Museum, Copenhagen, Denmark (L. Lyneborg and B. Petersen).

ZFMAK Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, West Germany (H. Ulrich)

ZMUH Zoological Museum of the University, Helsinki, Finland (W. Hackman and B. Lindeberg).

ZSI Zoological Survey of India, Calcutta, India (T.N. Ananthakrishnan, A.K. Ghosh, A.N.T. Joseph and B.K. Tikader).

Genus ***PARAGUS*** Latreille

Paragus Latreille, 1804: 194. Type-species: *Syrphus bicolor* Fabricius (by monotypy).

Paragus is the only genus of the tribe Paragini, and has been treated well by Stuckenberg (1954a, 1954b), Dušek & Láska (1967: 22), Vockeroth (1969: 12; 1986), and Goeldlin de Tiefenau (1976). The immature stages of some species have been described by Metcalf (1911, 1913), Bhatia & Shaffi (1933), Heiss (1938), Dixon (1960), Dušek & Láska (1967), Tao & Chiu (1971), Tawfik *et al.* (1974), and Goeldlin de Tiefenau (1974). Okuno (1967), Láska & Starý (1980), and Ghorpadé(1981) listed the prey [mainly Homoptera: Aphididae, but also

Adelgidae (Narayanan *et al.*, 1967), Delphacidae (new record here), and Psyllidae (Mathur, 1935)] of Japanese, Czechoslovak, and Indian *Paragus* species, respectively. Agarwala *et al.* (1984) gave a few published records for "*serratus*" and "*tibialis*" from India. Other prey records of Indian species of *Paragus* are mentioned under the appropriate species below. Dušek *et al.* (1979: 370) listed *Diplazon laetatorius* (Fabricius) (Hymenoptera: Ichneumonidae) as a parasitoid of *Paragus quadrifasciatus* Meigen.

Key to Oriental species of *Paragus**

1. Scutellum black, without a serrate margin; eye pile uniform and unicolorous 2

– Scutellum yellow apically; eye with alternating fasciae of thick opaque white and thin translucent pale pile 9

2. Face entirely yellow, rarely brownish medially (females with brownish black median vitta); abdomen dark, entirely black, or third tergum with narrow yellow spots 3

– Face with median black vitta; if vitta weak, then abdomen extensively red 7

3. Spurious vein short, ending before junction of fourth vein and subapical crossvein (Fig. 1); hind tibia with a broad subapical black annulus 5

– Spurious vein long, extending beyond junction of fourth vein and subapical crossvein (Fig. 2); hind tibia orange, rarely with a slight apical brownish tinge, never with a black annulus 4

4. Wing extensively bare, with almost all of costal, basal and anal cells bare (Timor) .....*goeldlini* Thompson, sp. nov.

– Wing extensively microtrichose, with costal, basal and anal cells microtrichose on apical half or more (Malay peninsula to New Guinea) .....*atratus* de Meijere

5. Terga all black; fore and middle tibiae with middle ¼ or less brownish black; female frons shining black 6

– Third tergum with a pair of triangular or arcuate narrow yellow spots anteriorly; fore and middle tibiae orange yellow; female frons with a pair of white pollinose spots anteriorly, contiguous to eye margin (northwest Himalayas) .....*annandalei* Ghorpadé, sp. nov.

6. Abdomen sparsely and finely punctate, punctures smaller than largest ommatidium and separated by about 4× their diameters; paramere with a large apicoventral hook (Fig. 11) (Philippines) .....*stuckenbergi* Thompson, sp. nov.

– Abdomen more densely and coarsely punctate, punctures as large as largest ommatidium and separated by about twice their diameters; paramere simple, without a hook (Fig. 9) (Malay peninsula, Java) .....*brachycerus* Thompson, sp. nov.

7. Wing extensively bare, with almost all of costal, basal and anal cells bare (Fig. 1) 8

– Wing extensively microtrichose, with costal, basal and anal cells almost entirely microtrichose (Fig. 2) (Malay peninsula, Sumatra, Java) ..*villipennis* Thompson, sp. nov.

8. Male: Paramere greatly enlarged, produced and curved dorsally, more than twice as long as surstylus (Fig. 18), fourth sternum with posterior margin emarginate and ventrally produced to accomodate externally visible parameres; Female: Ventral 'genital opening' formed by eighth tergum and seventh sternum, wide, rounded oval, ¾ or equal length of fifth sternum (Pakistan, northern India, Nepal, ? Bhutan, China, Thailand, Malaysia, Indonesia, Philippines) .....*politus* Wiedemann

– Male: Paramere small, not produced dorsally, subequal to surstylus (see Goeldlin de Tiefenau, 1976: Fig. 1), fourth sternum with posterior margin truncate; Female: Ventral 'genital opening' narrow, transverse slit, shorter than ½ length of fifth sternum (? Iran, ? Pakistan, India, Nepal, Sri Lanka, Burma, ? China) .....*rufocinctus* (Brunetti)

9. Scutellum with a serrate posterior margin 10

– Scutellum with a smooth posterior margin 13

10. First tergum nearly all black, especially behind transverse ridge, only narrowly reddish on posterior margin; wing nearly completely bare, hyaline, with only a few scattered microtrichia apically; fore femur without black markings, even at base (India, Nepal, Sri Lanka).....*yerburiensis* Stuckenberg

– First abdominal tergum extensively reddish medially, not black (partially in some specimens) behind transverse ridge; fore femur variably black or not at all 11

11. Large species (7.3-9.0 mm); antenna longer than face; fore femur wholly brownish yellow and white, with no black markings; hind tibia with very little or no dark brown (southern and eastern India, ? Nepal, Sri Lanka) .....*auritus* Stuckenberg

– Smaller species (5.1-6.8 mm); antenna as long as face; fore femur at least basally brownish black or black; hind tibia with dark brown subapical annulus 12

12. Wing suffuse yellowish brown at least in costal cells; hind femur almost entirely dark brown; mesonotal pile long; abdomen with many conspicuous, reclinate black hairs (India, Sri Lanka, Nepal, Burma, China, Thailand, Vietnam, Malaysia, Singapore, Indonesia, Philippines, Taiwan,?New Guinea, ? Australia).....*crenulatus* Thomson

* We have not included *Paragus haemorrhous* Meigen and have not treated much material from China south of the Yangtze-Kiang River, in this paper.

Wing hyaline, never suffused with yellowish brown; hind femur yellow, with narrow dark brownish annulus; mesonotal pile short; abdomen with black hairs sparse and very inconspicuous (? Afghanistan, Pakistan, India) .....*serratus* (Fabricius)

13. Wing extensively bare, costal and basal cells bare, basal ¼ or more of apical, discal, cubital and anal cells bare; female seventh tergum with a pair of prominent tubercles (Europe, Middle East, India: Kashmir) ....*quadrifasciatus* Mcigen

Wing extensively microtrichose, apical ½ or more of costal cell microtrichose; apical ¼ of basal cells microtrichose; apical, discal and cubital cells microtrichose; female seventh tergum without tubercles (Europe, Middle East, Pakistan, India: Kashmir) .....*bicolor* (Fabricius)

Subgenus ***Pandasyopthalmus*** Stuckenberg

Paragus subgcnus *Pandasyopthalmus* Stuckenberg, 1954a: 100. Type-species: *Paragus longiventris* Loew (by original designation).

The synonymy of the Oriental species of this subgenus is questionable due to the inaccessibility of some of the types. Previous workers considered only *Paragus tibialis* (Fallén) to be widespread and common, and synonymised the locally described species under that name. *Paragus tibialis* (Fallén) does **not** occur in the Orient, where four species of the subgenus *Pandasyopthalmus* [this is the correct original spelling] occur: *Paragus rufocinctus* (Brunetti) is widespread in the Indian subregion including Sri Lanka but absent from the other islands; *politus* Wiedemann is common and widespread throughout (except in peninsular India and Sri Lanka); *goeldlini* Thompson, sp. nov. in Timor; and *villipennis* Thompson, sp. nov. in the Malay peninsula, Sumatra and Java. On the basis of these distributions, the various names for which I (FCT) have not been able to study types are tentatively synonymised. While this synonymy is dubious, it is of little consequence as all the names synonymised are junior to any of the valid names used.

Paragus atratus de Meijere
(Fig. 13)

Paragus atratus de Meijere, 1906: 85. Lectotype male, Manokwari, New Guinea; here designated[ITZ: examined]. SUBSEQUENT REFERENCES*: Brunetti, 1915: 202 (Bijrani, Naini Tal District; Java), 1923*: 33 (key reference, description; India, Java); Keiser, 1952: 154 (Sumba; Timor record applies to *goeldlini*); Knutson *et al.*, 1975:328 (catalog citation; India: Uttar Pradesh; Java, Malaya, Sumatra, Sumbawa, Timor, New Guinea); Ghorpadé, 1981*: 64 (misidentification ?; prey from Indian subcontinent); Datta & Chakraborti, 1984: 245 (misidentification; Jammu & Kashmir).

De Meijere mentioned only a single male in his original description, but there are *two* identically labeled types in his collection [ITZ]. I (FCT) consider the "1" in the original description to be an error. Both syntypes are now without heads, although when I first studied them in 1974 they had heads. I have designated one of the syntype males as the lectotype and have so labeled it.

SPECIMENS EXAMINED: Lectotype male (present designation), labelcd "Manokwari, 15 Mei '03", "Paragus atratus n. sp., Type, de Meijere det '04", "TYPE" (red label) [ITZ].
Paralectotype male, same data as for lectotype [ITZ].
Other specimens: 11m 6f. **Malaysia:** Johore, Bontians, 27.xi.1967, 1m 1f [USNM]. **Singapore:** 2m (*C.F. Baker*) [USNM]. **Indonesia:** JAVA: 1m (*Jacobson*) [ITZ]; WEST SUMBA: Pogobina, 16.ix.1949, 1m 1f (*Expedition Buhler-Sutter*); EAST SUMBA: Baing, valley of Wai Lekabe, 28.vi.1949, 1m 1f (*Expedition Buhler-Sutter*); [NMB]; CENTRAL SUMBA: Lokojengo, 22-26.ix.1949, 4m 2f (*Expedition Buhler-Sutter*); AMBOINA: vi.1908, 1m 1f (*F. Muir*) [AMNH].

DISTRIBUTION: Malaysia, Indonesia (Sumatra, Java, Sumbawa, Sumba, Timor, Amboina), Singapore, New Guinea. Brunetti's "second male" (see Brunetti, 1923: 34) in the Indian Museum [= ZSI] collection, from "Bijrani, Naini Tal District, base of W. Himalayas, 19.iii.1910", was not found by me (KG) and the catalog entry (Knutson *et al.*, 1975: 328) from "India [Uttar Pradesh]" needs to be verified. Datta & Chakraborti's (1984: 245) specimens from Udhampur and Bijbihara in Jammu & Kashmir (India) were misidentified as *atratus:* they are *annandalei* Ghorpadé, sp. nov. (*q.v.*) (KG) [Map I].

PREY RECORD: *Toxoptera aurantii* (Boyer de Fonscolombe) (see Ghorpadé, 1981: 64). This record, from an unknown locality in India, is questionable and

* Subsequent references included for species in this paper are generally those not cited in Brunetti (1923) and Ghorpadé (1981), which should also be consulted. A more complete review of literature will be included in a future revision of Oriental Paragini.

Paragus tibialis: Ghorpadé, 1981: 65 (prey from Indian subcontinent; misidentification); Agarwala *et al.*, 1983a: 240 (prey from Kalimpong); Das & Raychaudhuri, 1983: 33 (prey from Chamba and Manali); Mathur, 1983: 231 (prey from Jullundur); Agarwala *et al.*, 1984: 18 (prey from India); Datta & Chakraborti, 1984: 244 (Jammu & Kashmir; misidentification; flower records), 1986b: 11 (West Bengal; misidentification).

Paragus politus Wiedemann was described from an unspecified number of males and females in the Trentepohl Collection [now in UZM] and in the Wiedemann Collection [now in NMW]. I (FCT) have studied male syntypes from both collections and here select a male lectotype for *politus* Wiedemann, 1830. The holotype of *rufiventris* Brunetti was found by me (KG) to be lost. Only a bare pin with the labels — "Assam–Bhutan Frontier, Mangaldai dist. N. E. 1-2.1.11, S. W. Kemp", "TYPE", "1492/HI", and "no specimen on pin, 6.VIII.41", remains in the Zoological Survey of India, Calcutta, type collection.

Paragus politus is the sister species of *villipennis* Thompson, sp. nov., and together these species form the Oriental component of the *tibialis* – superspecies and are the sister-group of *minutus* Hull of the Afrotropical Region. *Paragus politus* is very similar to *tibialis* (Fallén), but differs in having larger and more curved parameres (Fig. 18) and in lacking a dorsolateral carina on the ninth sternum.

Part of the material identified and recorded as *tibialis* by Datta & Chakraborti (1984: 244-245) is of *politus*, and that recorded as for *rufiventris* is entirely of *politus*. Their Fig. 5a, b of "*tibialis*" is actually of *rufocinctus* and that of "*rufiventris*" (Fig. 6a, b) is of *politus* (KG).

SPECIMENS EXAMINED: Lectotype male (present designation), labeled "China, Wiedemann Coll.", "politus, det. Wiedemann" [NMW].

Holotype male (of *Pipizella indica* Brunetti), labeled "Matiana, 8000 ft., Simla Hills, 28-30.IV.07, N.A.", "4482/15", "Pipizella indica Brun Type male", and "TYPE" [ZSI].

Other specimens: 40m 31f. **India:** JAMMU & KASHMIR: Gulmarg, c. 2600-3000mt, 17.viii.-5.ix.1978, 2f (*Copenhagen Zool. Mus. Exp.*); Tangmarg, c. 2200mt, 17.viii.-7.ix.1978, 1f (*Copenhagen Zool. Mus. Exp.*); UTTAR PRADESH: Mussoorie, c. 1500-2200mt, 3-14.viii.1978, 1f (*Copenhagen Zool. Mus. Exp.*); Dehra Dun valley, c. 700mt, 4-13.viii.1978, 1m 3f (*Copenhagen Zool. Mus. Exp.*) [UZM]; Kumaon Hills, Kapkot, 1067mt, 25.ix.1973, 3m (*K.D. Ghorpadé* A1); same locality, 10.x.1973, 1m (*K. D. Ghorpadé* A19); WEST BENGAL: 8km E. Kalimpong, 1768mt, 29.x.1981, 1m 1f (*C.A. Viraktamath* CAV274); Kalimpong, 1370mt, 29.x.1981, 1m 1f (*Shashidhar* SV180); same data, 2m 2f (*K. D. Ghorpadé* A935); 4km N. Teesta, 200mt, 28. x . 1981, 1m (*K. D. Ghorpadé* A934); Sukna, 12km N. Siliguri, 1.xi.1981,1m (*C. A. Viraktamath* CAV277); SIKKIM: Singtam, 30.x.1981, 2m (*C.A. Viraktamath* CAV275); MEGHALAYA: Nongpoh, 762mt, 4.xi.1981, 4f (*K.D. Ghorpadé* A938); Shillong, 1961mt, 17.iv.1974, 1f (*K.D.Ghorpadé* A100) [KGC]. **Thailand:** Khao Yai National Park, 8.xi.1977, 3m (*G.F. Hevel*) [USNM]; Doi Inthanon Natn Park, road to summit, 800-1800mt, 28.x.1979, 2m 2f (*Copenhagen Zool. Mus. Exp.*); Chieng Mai Province, Doi Saket, 950mt, 3.x.1981, 1m 2f (*Copenhagen Zool. Mus. Exp.*); Doi Inthanon Natn Park, Siripum, 1300-1400mt, 8.x.1981, 1m (*Copenhagen Zool. Mus. Exp.*); same locality, 1200-1300mt, 4.x.1981, 2m 1f (*Copenhagen Zool. Mus. Exp.*); Huai Sai Luang, 1000-1100mt, 13. x. 1981, 1m 1f (*Copenhagen Zool. Mus. Exp.*); Doi Suthep, summit, 1600mt, 27.ix.1981, 1f (*Copenhagen Zool. Mus. Exp.*); 7km NW. Fang, Horticultural Experimental Station, 30.x.-2.xi.1979, 2f (*Copenhagen Zool. Mus. Exp.*) [UZM]. **China:** Kwangtseh-Fukien, 17.viii.1937, 1m (*J. Klapperich*); Shaowu-Fukien, 500mt, 8.vii.1937, 1m (*J. Klapperich*) [ZFMAK]; Woo-fu SSU, 11.v.1932, 1f, 29.v.1932, 1m [AMNH]; Chengtu, 1f (*Crampton*) [MCZ]. **Malaysia:** Johore, 8.ii.1970, 1m (*C. G. Roche*); Perak, Ulu Piah, nr Ipoh, 9.ix.1973, 1m [USNM]. **Indonesia:** WEST SUMBA: Pogobina, 16.x.1949, 1f (*Expedition Buhler-Sutter*); CENTRAL SUMBA: Lindiwatju, 10.x.1949, 1f (*Expedition Buhler-Sutter*) [NMB]. **Philippines:** LUZON: Mountain Province, Mayoyao, Ifugao, 1000-1500mt, 1-9.vii.1966 & 24.viii.1966, 6m (*H. M. Torrevillas*) [USNM]; Camarines Sur, Mt Isarog, Pili, 800-900mt, 22. iv.1965, 1m (*H.M. Torrevillas*); Mt Province, Ifugao, Mayoyao, 1000-1500mt, 6.vii.1966, 1m (*H.M. Torrevillas*); same locality, 9.vii.1966, 1f (*H.M. Torrevillas*) [AMNH]; Banahao, vi. 1914, 1m; Los Baños, 18.xi. 1966, 1f [ZMUH]; NEGROS ORIENTAL: Mount Talinas, 1000mt, 29-31.xii.1960, 2m (*H.M. Torrevillas*); MINDANAO: Mountain View College, 15km NW. Valencia, Bukidnon, 2200mt, 22-23.iv.1958, 1m (*M.D. Delfinado*) [USNM].

DISTRIBUTION: Pakistan, India (Jammu & Kashmir, ?Punjab, Himachal Pradesh, Uttar Pradesh, ?Bihar, West Bengal, Sikkim, Assam, Meghalaya), Nepal, ?Bhutan, Thailand, China, Malaysia, Indonesia (Sumba), Philippines [Map 3].

PREY RECORDS: The aphids *Aphis citricola* van der Goot, *A. craccivora* Koch, *A. gossypii* Glover, *Melanaphis sacchari* (Zehntner), *Myzus persicae* (Sulzer), *Rhopalosiphum maidis* (Fitch), *Toxoptera aurantii* (Boyer de Fonscolombe), and undetermined aphids on *Osbeckia crinita* and *Carthamus oxyacantha*, are credited to *Paragus indicus* (Brunetti) and *P. tibialis* (Fallén) (see Ghorpadé, 1981: 64-65). Das & Raychaudhuri

perhaps attributable to another species of *Paragus*, probably *politus* Wiedemann (*q.v.*).

Paragus goeldlini Thompson, sp. nov.
(Figs 14, 15)

Paragus atratus: Keiser, 1952: 154 (Timor records: misidentification).

MALE: *Head:* Face and frontal triangle yellow, with white pile; oral margin and cheek black, bare; vertical triangle black, shiny except with yellowish white pollen anterior to anterior ocellus, with brown pile; occiput black, with silvery pollen, with white pile ventrally becoming more yellowish on dorsal ¼ except with a few black hairs intermixed dorsally; eye pile uniform, short, white; holoptic; eye contiguity about 6-7 ommatidia long. Antenna short, only ⅔ as long as face, orange brown except orange basoventral ½ of third segment, with black pile; third segment about twice as long as wide; arista brown, short, only about as long as third segment; ratio of segments — 1.0 : 1.0 : 3.7. *Thorax:* Black; mesonotum shiny, with short white pile, punctate; punctures small and widely spaced; scutellum shiny, with white pile, punctate, punctures spaced as on mesonotum; pleuron with white pollen and pile, punctate as on mesonotum; squama white; halter orange. *Legs:* With white pile, orange, except brownish black as follows: coxae, trochanters, basal ⅓ of front femur, basal ½ of middle femur, basal ¾ of hind femur. *Wing:* Hyaline, microtrichose, except bare as follows: first and second costal cells, basal ½ of marginal cell, basal ⅕ of submarginal cell, partially on basal ¼ of apical cell, basal ⅓ of discal and cubital cells, anterobasal ⅔ of anal cell and anal lobe, and all of both basal cells and alula. *Abdomen*: Black, except bluish black basolaterally on each tergum, shiny, punctate, with punctures large (as large as the largest ommatidium) and closely spaced; dorsum with white pile basolaterally on each tergum, with black pile apicomedially on each tergum; venter with white pile. *Terminalia:* Black, with white pile, otherwise as in Figs 14-15.

FEMALE: Similar, except for normal sexual dimorphism and: Yellow face with narrow black medial vitta, black front, antennal ratio — 1.0:1.4:3.6.

SPECIMENS EXAMINED: Holotype male, **Indonesia:** TIMOR: Mollo, 1350mt, vi. 1935 *(C. Buhler & Meyer)* [NMB].

Paratype female, same data as for holotype [NMB].

DISTRIBUTION: Indonesia (Timor) [Map 1].

REMARKS: This species is dedicated to Dr Pierre Goeldlin de Tiefenau, Musee Zoologique, Lausanne, Switzerland, in recognition of his revisionary work on European *Paragus* species. *Paragus goeldlini* is the sister of *atratus*, being similar to that species except for its barer wings and slightly differently shaped paramere.

Paragus politus Wiedemann
(Figs 1, 18, 19)

Paragus politus Wiedemann, 1830: 89. Lectotype male, China; here designated [NMW: examined]. SUBSEQUENT REFERENCES: Shiraki, 1930: 247 (Taiwan, Japan; misidentification?); Knutson *et al.*, 1975: 328 (catalog citation; China, Philippines).

?*Pipizella indica* Brunetti, 1908: 52. Holotype male, Matiana, Simla Hills [ZSI: examined]. SUBSEQUENT REFERENCES: Brunetti, 1915: 201 (placed in *Paragus*, "perhaps identical with *Paragus politus*"; India: Darjeeling, Matiana, Tenmalai), 1917: 83 (Matiana; Nepal), 1923: 33, pl. 1, fig. 8 (head) (key reference, description; Nepal, India); Biswas *et al.*, 1974: 24 (Shillong); Raychaudhuri *et al.*, 1978: 93 (prey; Manipur); Ghorpadé, 1981: 64 (prey from Indian subcontinent). **syn. nov.**

?*Paragus rufiventris* Brunetti, 1913: 157. Holotype male, Mangaldai, Assam–Bhutan Frontier [ZSI: lost]. SUBSEQUENT REFERENCES: Brunetti, 1915: 201 (reference to original description where recorded also from Sadiya, Dhikala, Bijrani and Peradeniya), 1923: 34 (several localities in India, Pakistan, Bhutan border and Sri Lanka); Shiraki, 1930: 248 (as synonym of *tibialis)*; Knutson *et al.*, 1975: 328 (catalog citation, as subspecies of *tibialis;* Sri Lanka, Assam, Nepal, Pakistan); Joseph & Parui, 1977:228 (Tholkabad, Chaibasa District, Bihar); Agarwala *et al.*, 1983a: 240 (misidentification as *tibialis;* prey from Kalimpong); Datta & Chakraborti, 1984: 245, Fig. 6a, b (Jammu & Kashmir; flower records), 1986b: 11 (West Bengal, ?Sikkim); Singh *et al.*, 1985: 146, Figs 7-13 (male terminalia; ?Chandigarh). **syn. nov.**

Paragus ruficaudatus Keiser, 1952: 154 (preoccupied by Bigot, 1884). Holotype male, Lokojengo, Central Sumba [NMB: examined].

Paragus keiseri van der Goot, 1964: 219 (new name for *Paragus ruficaudatus* Keiser). SUBSEQUENT REFERENCE: Knutson *et al.*, 1975: 328 (catalog citation; Java, Sumbawa). **syn. nov.**

Paragus atratus: Keiser, 1952: 154 (Sumba records in part; misidentification); Ghorpadé, 1981: 64 (prey from Indian subcontinent; misidentification).

(1983: 33) give *Brachycaudus* (*Thuleaphis*) *rumexi colens* (Patch) and *Metopolophium phaseoli* (Chakrabarti, Ghosh & Raychaudhuri) as prey of *Paragus "tibiallis"* [sic!]. Agarwala *et al.* (1984: 18) list some aphid species as prey of *"tibialis"*, including unidentified "aphis" on the plants *Centaurea* sp. and *Sonchus* sp. The syrphid predator involved in most or all of these prey records is either *Paragus politus* or *P. rufocinctus.*

FLOWER RECORDS: Datta & Chakraborti (1984: 244-245) give *Amaranthus spinosa, Cynodon* sp., *Lantana camara and Solanum nigrum* for *Paragus politus* which they misidentified as *tibialis* and *rufiventris.*

Paragus rufocinctus (Brunetti)
(Figs 7, 8)

Pipizella rufocincta Brunetti, 1908: 53. Holotype male, Rangoon, Burma [BMNH: examined]. SUBSEQUENT REFERENCES: Brunetti, 1923: 37 (key reference, description; India, Burma), 1925: 75 (not a *Pipizella*, but exact placement not known); Knutson *et al.*, 1975: 328 (catalog citation; placement in *Paragus).*

Paragus tibialis: Keiser, 1958: 210 (Sri Lanka; as *tibialis s. str.* and var. *rufiventris*; misidentification); Ghorpadé 1981: 65 (partially misidentified; prey from Indian subcontinent); Anonymous, 1981: 89 (misidentified; prey from south India); Agarwala *et al.*, 1983a: 240 (misidentification; prey from Kalimpong); Das & Raychaudhuri, 1983: 33 (misidentification; prey from Manali and Chamba); Mathur, 1983: 231 (misidentification; prey from Jullundur); Agarwala *et al.*, 1984: 18 (misidentification; prey from India); Datta & Chakraborti, 1984: 244, Fig. 5a, b (misidentification in part; Jammu & Kashmir, flower records), 1986b: 11 (West Bengal; misidentification).

?*Paragus abrogans* Goeldlin de Tiefenau, 1976: 84, Fig. 1 (male terminalia). Holotype male, Polur, Iran [MZL]. **syn. nov.**

Paragus (Pandasyophthalmus) [sic!] *rufiventris:* Datta & Chakraborti, 1986a: 57 (Kerala; misidentification).

I (FCT) have examined the holotype of *rufocinctus* Brunetti and find that it agrees with Goeldlin de Tiefenau's (1976) description of his *abrogans.* I have not been able to obtain the loan of the type of *abrogans. Paragus haemorrhous* Meigen and *P., rufocinctus* are very similar and may represent only variants of the same species. Goeldlin de Tiefenau (1976) separated these two (*rufocinctus* as his *abrogans*) only by the shape of the paramere: In *haemorrhous* the paramere is small and rectangular; in *rufocinctus* it is slightly larger and has the dorsal and ventral margins diverging slightly from the base to give it a trapeziform shape. The material we have examined suggests that the shape of the paramere varies greatly (see also Vockeroth, 1986: 196, Fig. 3e-e").

Part of the material from Jammu & Kashmir (India) listed as *"tibialis"* by Datta & Chakraborti (1984: 244-245, Fig. 5a, b) was found by me (KG) to be of *rufocinctus;* part belonged to *politus.*

SPECIMENS EXAMINED: Holotype male, labeled "Brunetti, Rangoon, Burma, 23.XII.04 to, 3.1.05", "Brunetti, Collection", "Pipizella, rufocincta, Brunetti, Type male", "Pres. by, E. Brunetti, Brit. Mus., 1927-184" [BMNH].

Other specimens: 57m 23f. **India:** JAMMU & KASHMIR: Tangmarg, 2200mt, 17.viii.-7.ix.1978, 9m (*Copenhagen Zool. Mus. Exp.*) [UZM]; Srinagar, 1893mt, 16.vii.1981, 2m (*M. Rafiq Bhat*); same locality, 16.x.1974, 1m 1f (*K.D. Ghorpadé* A138); same locality, 19.x.1974, 1m (*K.D. Ghorpadé* A142); HIMACHAL PRADESH: Manali, 1828mt, 10.x.1979, 1m (*K.D. Ghorpadé* A841); Simla, 2133mt, 14.x.1979, 3m (*K.D. Ghorpadé* A847) [KGC]; WEST BENGAL; Sukna, 55km S. Darjeeling, v. 1966, 1m (*J.&M. Sedlacek*) [BPBM]; 8km E. Kalimpong, 1768mt, 29.x.1981, 1m (*C.A. Viraktamath* CAV274); MEGHALAYA; Shillong, 1961mt, 16.iv.1974, 2m (*K.D. Ghorpadé* A99) same locality, 1465mt, v.1962, 1m (*V.K. Gupta* No. 8); same locality, 1961mt, 3.xi.1981, 1m (*C.A. Viraktamath* CAV278) [KGC]; Shillong, Tripura Castle road, 1.ix.1972, 1m (*S. Biswas*) [ZSI]; Cherrapunji, 1299mt, 5.xi.1981, 1m (*C.A. Viraktamath* CAV282); Nongpoh, 762mt, 4.xi.1981, 1f (*K.D. Ghorpadé* A938); KARNATAKA: Jog Falls, 534mt, 18.xi.1976, 1f (*K.D. Ghorpadé* A369); Mudigere, 900mt, 7.iv.1975, 1m (*K.D. Ghorpadé* A187) [KGC]; same locality, 2-10.xi.1977, 1m 1f (*Copenhagen Zool. Mus. Exp.*) [UZM]; 15km S. Santaveri, 15.viii.1977, 1m (*K.D. Ghorpadé* A456); nr Kodlipet, 650mt, 6.iv.1975, 1m (*K.D. Ghorpadé* A186); Ramandrug, 990mt, 16.xi.1974, 1m 1f (*K.D. Ghorpadé* A146); Bangalore, 916mt, 19.xii.1975, 1m 1f (*K.D. Ghorpadé* A265); same locality, vi.1977, 1f (*K.D. Ghorpadé* A438); same locality, 6.ix.1978, 1m (*K.D. Ghorpadé* A665); same locality 4.iv.1980, 1m 1f (*K.D. Ghorpadé* A879); TAMIL NADU: Yercaud, 1370mt, 5.iv.1976, 1m (*K.D. Ghorpadé* A300); Valparai, 1067mt, 5.vii.1982, 1m 1f (*K.D. Ghorpadé* A968); KERALA: Kaikatty, 937mt, 1.i.1974, 1f (*K.D. Ghorpadé* A77); same locality, 2.i.1974, 12m 6f (*K.D. Ghorpadé* A80); same data, 2m (*K.D. Ghorpadé* A81); Manantoddy, 840mt, 16.x.1975, 1m 1f (*K.D. Ghorpadé* A238); Meppadi, 690mt, 19.x.1975, 1f (*K.D. Ghorpadé* A249) [KGC]. **Sri Lanka:** Madugoda, 30.iii.1936, 1m; Bandarawella, 15.iv.1931, 1m [CNM]. Also 3m 5f seen in the collections of the

Smithsonian Sri Lanka Project* [USNM]. **Nepal:** Amlekhganj, 520mt, 16.iii.1957, 1m [USNM]. **Burma:** Myitkyina, 175mt, 1-14.iii.1934, 1m (*R. Malaise*) [ZMUH].

DISTRIBUTION: ?Iran, ?Pakistan, India (Jammu & Kashmir, Himachal Pradesh, ?Punjab, West Bengal, Meghalaya, Karnataka, Tamil Nadu, Kerala), Sri Lanka, Nepal, Burma, ?China [Map 2].

PREY RECORDS: The aphid *Pentalonia nigronervosa* Coquerel (see Ghorpadé, 1981: 64). I (KG) have seen specimens reared on *Toxoptera aurantii* (Boyer de Fonscolombe) infesting tea at Cinchona (see also Anonymous, 1985: 18). I have also reared larvae taken feeding on an undetermined aphid infesting an unidentified herb at Bangalore in June (my Collection No. A438), and have also taken specimens at the same locality by sweeping paddy fields. Das & Raychaudhuri (1983: 33) give aphid prey for "*tibiallis*" [sic !] from Manali and Chamba in Himachal Pradesh. Mathur (1983: 231) lists *Aphis gossypii* Glover as prey from Jullundur. Agarwala *et al.* (1984: 18) give several aphid species as prey of "*tibialis*", some of which may refer to this species. See also this section under *Paragus politus* above.

FLOWER RECORDS: Datta & Chakraborti (1984: 244-245) give *Amaranthus spinosa*, *Cynodon* sp., and *Solanum nigrum* for this species, which they misidentified as *tibialis*.

Paragus villipennis Thompson, sp. nov.
(Figs 2, 16, 17)

Paragus atratus: de Meijere, 1914: 150 (Java; misidentification).

MALE: *Head:* Face yellow except for black medial vitta which reaches ⅔ distance to antenna, with white pile; frontal triangle yellow, with white pile; oral margin and cheek black, bare; vertical triangle black, shiny except with sparse brownish pollen anterior to anterior ocellus, with black pile except for a few yellow hairs anteriorly; occiput black, with silvery pollen, with white pile ventrally becoming more yellowish on dorsal ¼; eye pile uniform, short, white; holoptic; eye continguity about 2-3 ommatidia long. Antenna short, only ¾ as long as face, brownish black except orange basoventral ½ of third segment, with black pile; arista brown, short, only about as long as third segment; ratio of segments — 1.1 : 1.0 : 4.2. *Thorax:* Black; mesonotum shiny, with short white pile, punctate, with punctures small and widely spaced; scutellum shiny, with white pile, punctate, with punctures spaced as on mesonotum, pleura with white pollen and pile, punctate as on mesonotum; squama white; halter orange. *Legs:* With white pile, orange, except brownish black as follows: Coxae, trochanters, basal ⅓ of front femur, basal ½ of middle femur, basal ¾ of hind femur, apicomedial ⅓ of hind tibia, and hind basotarsomere. *Wing:* Slightly brownish, microtrichose. *Abdomen:* Black; except red posterior to second tergum, shiny, punctate, with punctures large (as large as the largest ommatidium) and closely spaced; dorsum with white pile basolaterally on each tergum, with black pile intermixed apicomedially on each tergum; venter with white pile. *Terminalia:* Black, with white pile, otherwise as in Figs 16-17.

FEMALE: Similar, except for normal sexual dimorphism and : Antennal ratio — 1.0 : 1.0 : 3.0; black front; abdomen entirely black except bluish black basolaterally on each tergum.

SPECIMENS EXAMINED: Holotype male, **Indonesia:** JAVA: Goenoeng Gedeh, III. 1911 (*E. Jacobson*) [ITZ].

Paratypes 2m 2f; same data as for holotype, 1f [ITZ]; Salatiga, 5.v.1929, 1m (*t.M. Mackerras*) [ANIC]; SUMATRA: Pangherang-Pisang, x.1890-iii.1891, 1f (*E. Modigliani*) [MCSNG]. **Malaysia:** The Gap, Fraser's Hill, 23.iii. 1962, 1m (*D.H. Colless*) [ANIC].

DISTRIBUTION: Malaysia (Malay peninsula), Indonesia (Sumatra, Java) [Map 2].

REMARKS: *Paragus villipennis* is the sister of *politus*, differing from that species only in its more extensively microtrichose wing. The name, *villipennis*, is a Latin adjective, which describes this character.

Subgenus *Paragus* Latreille

Stuckenberg (1945a) divided this subgenus into two distinct species-groups, based on whether the posterior margin of the scutellum is serrate (*serratus*-group) or not (*bicolor*-group). The *serratus*-group is mainly Old World tropical in distribution, occurring in the African continent and in south and southest Asia. The *bicolor*-group, on

*Detailed label data for these specimens will be included in our forthcoming review of the Syrphidae of Sri Lanka (Thompson & Ghorpadé, in prep.).

the other hand, is predominantly Holarctic. The three new species described here do not fit either of Stuckenberg's species-groups. These species share a mixture of the characters Stuckenberg used to define his subgenera: The simple eye pile of the subgenus *Pandasyopthalmus*, but the short spurious vein of the subgenus *Paragus*. The terminalia of these species are unlike those of either subgenus. The phylogeny of the genus *Paragus* will be reviewed in another paper (Thompson, in prep.).

Paragus annandalei Ghorpadé, sp. nov.
(Figs 5, 6)

Paragus (Pandasyophthalmus) [sic!] *atratus:* Datta & Chakraborti, 1984: 245, Fig. 7a, b (Jammu & Kashmir; misidentification).

Length: 6-7 mm.

MALE : *Head:* Face and frontal triangle yellow, with yellow pile and a few black hairs beside antennal bases; oral margin and cheek black, most of cheek and area contiguous to eye margins white pollinose and pilose, area contiguous to oral cavity shining black and bare; tubercle barely apparent, with a thin and narrow translucent vitta extending from it and joining brown tip of oral cavity, distinct from rest of yellow face and frons; vertical triangle black, shining, except for brownish yellow pollinose area anterior to anterior ocellus, with black pile except some yellow pile posteriorly; occiput black, silvery white pollinose and thick white pile becoming thinner and yellowish on dorsal ⅓; eye pile uniform, short, white; holoptic; eye contiguity seven ommatidia long; antenna short, about ⅔ as long as face, brownish black except paler anteroventral outer margin on first segment, narrow anterior outer margin on second segment and basoventral ½ of third segment; arista pale brown, almost as long as third segment; ratio of antennal segments – 1.0 : 0.8 : 4.1. *Thorax:* Black; mesonotum shiny, with short golden yellow pile, except longer white pile on notopleuron, punctate, with punctures small, shallow, and widely spaced; scutellum shining, black, a little more deeply punctate, pile a little longer, rest as on mesonotum; pleuron with sparse white pollen and pile, with hairs on posterior mesopleuron and dorsal sternopleuron very long and dense; squama white with yellow margin and fringe; halter with light brown base, with yellowish white stem and ivory white to faintly yellow knob. *Legs:* With white pile, orange yellow, except black as follows: Coxa, trochanter, a little more than basal ½ of fore femur, basal ⅔ of middle femur, basal ¾ of hind femur (extreme base brown), more than apical ½ of hind tibia (extreme apex brown), and hind tarsus dorsally. *Wing:* Hyaline, microtrichose, except bare as follows: First costal cell, basal ⅓ of second costal cell, area of marginal cell basad of fork of vein R_{2+3} and R_{4+5}, basal ⅔ of first, and basal ½ or less of second basal cell, and extreme base and up to ½ of anal cell anteriorly. *Abdomen:* Black, shiny and more deeply punctate than on scutellum, with punctures more closely spaced; extreme posterior margins of terga bare, smooth and bluish, widest on first tergum; dorsal pile short, subdepressed and black, longer and white on anterior tergal margins and on first tergum, with hairs longest on third and fourth terga and on each tergum anterolaterally; lateral margins with still longer white hairs, longest posterolaterally on first tergum; third tergum with triangular yellow spots on anterior margin, widely separated from lateral margins and in centre, contiguous with anterior margin of tergum, placed in the sunken area on anterolateral ⅓ of tergum; sterna black except anterior ½ of third sternum translucent yellow; sternal hairs erect, white, sparse, except dense on fourth sternum. *Terminalia:* As in Figs 5-6.

FEMALE: Similar to male except as follows: Frons 1½ × as wide at antennal bases than at vertex, shining black, ventrally with two white pollinose spots contiguous to eye margins; frontal spots widest posteriorly, narrowing anteriorly to join yellow of face lateral to antennal bases; frontal pile black posterior to white pollinose spots, elsewhere white; face deep yellow with a narrow brownish black facial vitta from oral margin, narrowing dorsally to antennal bases; occipital pile almost wholly white. Hairs on mesonotum and scutellum more whitish; halter knob yellowish. Wing with a little more microtrichia, but essentially as in male. Abdomen with yellow spots on third tergum narrower and arcuate, not contiguous with anterior margin.

SPECIMENS EXAMINED: Holotype male, **India:** HIMACHAL PRADESH: Simla, 2133mt, 14.x.1979 (*K.D. Ghorpadé* A847) [KGC].

Paratypes 4m 2f. **India:** JAMMU & KASHMIR: Udhampur, 27.ix.1977, 4m (*R.C. Basu & party*, No. 6310/H_6 to 6313/H_6) [ZSI; 1m to be deposited in USNM]; UTTAR PRADESH: Mussoorie, c. 1500-2000mt, 3-14.viii.1978, 1f (*Copenhagen Zool. Mus. Exp.*) [UZM];Kumaon Hills, Dunagiri, 2286mt, 12.x.1973, 1f (*Girish Chandra* G66) [KGC].

DISTRIBUTION : India (Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh) [Map 1].

FLOWER RECORD : Datta & Chakraborti (1984: 245) give *Solanum nigrum*.

REMARKS : This species is similar to *jozanus* Matsumura (*in* Matsumura & Adachi, 1916: 10, Fig. 5) from Japan, but is distinct as follows: 1) hairs on vertex yellowish white, not black; 2) scutellar hairs all yellowish white and without brown ones on margin; 3) no trace of white spots on fourth tergum; 4) first and second sterna black, only third sternum partly yellowish; and 5) different male terminalia.

Datta & Chakraborti (1984: 245, Fig. 7a, b) listed this species, misidentified by them as *atratus*, from Udhampur in Jammu & Kashmir. I (KG) found the single female (not male as published !) from Bijbihara to belong to *politus* (ZSI Reg. No. 6314/H_6). I have designated the 4m from Udhampur as paratypes of my *annandalei* sp. nov.

This new species is named in honor of the late Dr Nelson Annandale, the first Superintendent of the Indian Museum, and later to become the first Director of the Zoological Survey of India, Calcutta (see Ali, 1981: 238, P1. II). Annandale (*in* Brunetti, 1917: 59) noted that the higher reaches of the northwest Himalayas had a distinct Palaearctic influence. He was also instrumental in encouraging and assisting the late Enrico Brunetti's [see Prashad, 1927; Senior-White, 1927; also obituaries by Anonymous, 1927, *Entomologist*, 60: 142-143; Collin, 1927, *Proc. ent. Soc. Lond.*, 2: 106; Kemp, 1927, *Ent. mon. Mag.*, 63: 236-237; Anonymous, 1928, *Ent. News*, 39: 295; Musgrave, 1932, *Bibliog. Austral. Ent.*, pp. 33-34] monumental, and almost single-handed, revisionary work on Indian Diptera. Appropriately, the holotype was collected by me (KG) in Simla, where Dr Annandale did much of his early collecting, and which led to Brunetti's (1907a, 1907b, 1917, etc.) initial papers on Indian Diptera. Brunetti's written works have given me immense pleasure (and admiration for this dipterist) and have helped me along in my own researches on Indian flies.

Paragus auritus Stuckenberg

Paragus auritus Stuckenberg, 1945b: 418, Figs 30-33 (male terminalia, abdomen). Holotype male, Kandy, Sri Lanka [BMNH]. SUBSEQUENT REFERENCES: Keiser, 1958: 207 (Sri Lanka); Knutson *et al.*, 1975: 327 (catalog citation; Sri Lanka, West Bengal, Nepal, Kenya); Ali & Sharatchandra, 1985: 18 (prey; Kamataka).

Paragus auritus is a large, generally pale species, with the abdomen distinctly broader than the thorax and being noticeably distended in females. The antenna is long, usually longer than the length of face. Smaller specimens may be confused with *crenulatus* Thomson, but the fore femur of *auritus* is wholly pale, never with any black markings (as in *crenulatus*) on the extreme base.

Records of *serratus*, published before Stuckenberg (1954b) separated "*serratus* of authors" into four distinct Oriental species [*auritus* Stuckenberg, *crenulatus* Thomson, *serratus* (Fabricius), and *yerburiensis* Stuckenberg], are DUBIOUS. Even some later authors apparently confused *auritus*, *crenulatus* and *serratus*, though *yerburiensis*, with its predominantly black coloration, seems to have been separated with some ease. Unless specimens on which these previous records were based can be redetermined and the records confirmed, names in *all* biological papers and most taxonomic ones treating the *Paragus serratus*-complex must be considered doubtful.

Paragus auritus is apparently restricted to Sri Lanka and southern and eastern India. Stuckenberg's (1954b: 420) male from Kenya (east Africa) is a misidentification, perhaps for *azureus* Hull (also with blue reflections on mesonotum) or for *scrupeus* Stuckenberg, if these two *are* distinct species, or, to an undescribed one.

Besides the 132m and 75f listed below, I (KG) have also seen 31m and 32f in the TNAU Collection at Coimbatore. Complete label data were not copied for these but the specimens were from Aska (Ganjam District) and from Coimbatore, collected in

all months of the year except in March and June. Some were reared on the finger millet (*Eleusine coracana*) root aphid, *Tetraneura* (*Tetraneurella*) *nigriabdominalis* (Sasaki), and all other rearing records are also on root aphids of cotton (*Gossypium* spp.), paddy (*Oryza sativa*), and sorghum (*Sorghum bicolor*). I did not collect and rear syrphid larvae feeding on any root aphid, hence did not list any prey for this species (Ghorpadé, 1981: 64-65). However, the records of T. *nigriabdominalis* and undertermined aphids on ragi (finger millet) and sorghum roots, attributed to *serratus* in that paper, most certainly refer to *auritus*, which appears to be adapted to preying only on root aphids in its larval stages.

SPECIMENS EXAMINED: 132m 75f. India: WEST BENGAL: Calcutta, 1-15. xii. 1908, 1m (*E. Brunetti*); same locality, 20. xii. 1908, 3m (*E.Brunetti*) [USNM]; KARNATAKA: 10km N. Yelburga, 5. xi.1972, 1f (*K.D. Ghorpadé*); same locality, 6.xii.1974, 1m (*K.D. Ghorpadé* A153); same locality & collector, 13.xii.1974, 2m 1f (A163), 14.xii.1974, 3m 1f (A165) , 20.xii.1974, 1m (A171), 22.xii.1974, 1m (A173), 23.xii.1974, 4m (A174), 24.xii.1974, 5m 1f (A175 & A176), 23.xi. 1980, 3f (A906), 26.xi. 1980, 1m 4f (A909), 27.xi. 1980, 2m 1f (A910); Sandur, nr Bellary, 14.xi. 1974, 1m (*K.D. Ghorpadé* A143); same locality, 16.vii.1982, 1m 1f (*K.D. Ghorpadé* A980); Kemmangundi, 1430mt, 9.iv.1975, 1m (*K.D. Ghorpadé* A194) [KGC]; Mudigere area, c. 900mt, 2-10.xi.1977, 2m 1f (*Copenhagen Zool. Mus. Exp.*) [UZM]; 15km N. Chitradurga, 14.xi.1978, 1f (*J. Bowden*); Nandi Hills, 1467mt, 28.iii. 1979, 1m (*K.D.Ghorpadé* A782); Bangalore, 916mt, xii. 1970, 1m (*K.D. Ghorpadé*); same locality & collector, ix.1971, 1m, 25.xi.1972, 1m 1f, 30.xii.1972, 2m, i.i.1973, 1m, 4.i.1973, 1m; same locality, 13.xi. 1973, 1f (*K.D. Ghorpadé* A37); same locality & collector, 27.xi.1973, 1m (A41), 13-14.i.1973, ex Malaise trap, 1f (A89), 23.ix.1976, 1f (A346) 26.ix.1976, 1f (A348), 24.x.1976, 1m (A358), 16.i.1977, 1f (A383),4.ix.1977, 1f (A461), 9.x.1977, 2m (A485), 11.x.1977, 1m (A487),11-13.x.1977, 1f (A488), 3.ix.1978, 1f (A659), 15.x.1978, 1f (A705), 17.x.1978, ex Malaise trap, 1f (A707), 21.x.1978, ex Malaise trap, 1f (A712), 28.x.1978, 1f (A716), 19.xi.1978, 1m 1f (A735), 3.xi.1979, 2m 1f (A856), 10.xi.1979, 1f (A858), 29.xi.1979, 3m 1f (A861), 1.xii.1979, 1m (A862), 2.xii.1979, 3m 1f (A863), 8.xii.1979, two pairs *in copula*, 3m 2f (A864), 8-15.xii.1979, ex Malaise trap, 1m 1f (A865), 25.xii.1979, 1f (A868), 5.i.1980, 1m (A871), 24.ix.1980, 1m 1f (A896), 28.ix.1980, 5m (A897), 30.ix.1980,1m (A898), x.1980, 1f (A900), 27.xii.1981, 2m (A942), 30-31.i.1982, 2m (A945); Bangalore, Cubbon Park, 27.x.1979, 1m 1f (*A.R.V. Kumar* No. 160); same locality & collector, 4.xi.1979, 1m (No. 165) [KGC]; Bangalore, Allalsandra, c. 900mt, 30.xi.1977, 4m (*Copenhagen Zool. Mus. Exp.*); same locality & collectors, 26-29.x.1977, 1m [UZM]; Bannerghatta Park, nr Bangalore, 12.xi.1976, 1f (*K.D. Ghorpadé* A333); TAMIL NADU: Yercaud, 1370mt, 5.iv.1976, 1m (*K.D. Ghorpadé* A300) [KGC]; Coimbatore, 420mt, ix.1964, 1m (*P.Susai Nathan*) [BPBM]; same locality & collector, 31.vii.19(?),1m [MCZ];16mi. NW. Coimbatore, 640mt, 8.iii.1962, 1f (*E.S. Ross & D.Q. Cavagnaro*) [CAS]; Coimbatore, 1400ft, iii.1963, 1f (*P Susai Nathan*); same locality & collector, iv.1963, 3m 1f, xii.1963, 1m [USNM]. Sri Lanka: UVA PROVINCE: Inginiyagala, 30.viii.1953, 1m (*F. Keiser*); CENTRAL PROVINCE: Peradeniya Exper. Sta., 14.vii.1953, 1m (*F. Keiser*); Teldeniya, 11.i.1954, 1f (*F. Keiser*); Kandy, Hantana, 25.vii.1953, 1m (*F. Keiser*); Kandy reservoir, 17.vi. 1953, 1f (*F. Keiser*) [NMB]. Also 47m 29f seen in the collections of the Smithsonian Sri Lanka Project [USNM].

DISTRIBUTION: India (West Bengal, Karnataka, Tamil Nadu), Sri Lanka. The record from Nepal (Knutson *et al.*, 1975: 327) needs to be confirmed [Map 5].

PREY RECORDS: *Tetraneura nigriabdominalis* (Sasaki), and other undetermined root aphids on sorghum (*Sorghum bicolor*), paddy (*Oryza sativa*), cotton (*Gossypium* spp.), and finger millet (*Eleusine coracana*). See records for these under *Paragus serratus* (Fabricius) in Ghorpadé (1981: 64-65). I (KG) identified this syrphid for Ali & Sharatchandra (1985: 18) who had reared it on *Forda orientalis* George, a root aphid on finger millet at Bangalore.

FLOWER RECORDS : *Borreria* sp., *Guizotia abyssinica* (nigerseed), and *Mangifera indica* (mango).

Paragus bicolor (Fabricius)

Syrphus bicolor Fabricius, 1794: 297. Type o?, "Barbaria" [UZM]. SUBSEQUENT REFERENCES: Kertész, 1910: 2 (catalog citation; synonymy, other references; Europe, N.Africa, N.America); Brunetti, 1923: 35 (dercription, key reference; Quetta); Goeldin de Tiefenau, 1976: 89 (neotype designation, description, male terminalia, key refcrence); Ghorpadé, 1981: 64 (prey from Pakistan); Datta & Chakraborti, 1984:242 (as *serratus; misidentification).*

This Palaearctic species, the type-species of *Paragus* Latreille, was first recorded from the Indian subcontinent from Quetta (Baluchistan) by Brunetti (1923), and again from Pakistan by Hamid *et al.* (1977). The latter reared *bicolor* from *Aphis craccivora* Koch. I (KG) collected a pair, either in the Chasmashahi Mughal Garden or in the Nehru Memorial Park, in Srinagar (Kashmir). The two males from Chhatabal and Rangawara (Jammu & Kashmir), identified as *serratus* by Datta & Chakraborti (1984: 242-243), were found by me to

be *bicolor* on examining this collection at the ZSI, Calcutta.

Goeldlin de Tiefenau's neotype designation (1976:89) is invalid as some of original type material is still extant (FCT). He himself indicated that a set of wings remain in the Fabrician Collection.

SPECIMENS EXAMINED : 3m 1f. **India:** JAMMU & KASHMIR: Srinagar, 1893mt, 15.x.1974, 1m 1f (*K.D. Ghorpadé* A137) [KGC]; Chhatabal, 18.xi.1977, on *Solanum nigrum*, 1m (*M.Datta*); Rangawara, 19.xi.1977, on *Lantana camara*, 1m (*M. Datta*) [ZSI].

DISTRIBUTION: Palaearctic Region; Pakistan, India (Jammu & Kashmir) [Map 7].

PREY RECORD: The aphid *Aphis craccivora* Koch (see Ghorpadé, 1981: 64).

FLOWER RECORDS : Datta & Chakraborti (1984: 242-243) give *Lantana camara* and *Solanum nigrum.*

Paragus brachycerus Thompson, sp. nov.
(Figs 3, 4, 9, 10)

Length: About 4mm (specimens were reared and are teneral, so the measurement is imprecise).

MALE : *Head:* Face and frontal triangle yellow, with yellow pile; oral margin and cheek black, bare; vertical triangle black, shiny except with brownish pollen anterior to anterior ocellus, with yellow pile except for a few black hairs anteriorly; occiput black, with silvery pollen, with white pile ventrally becoming more yellowish on dorsal ¼; eye pile uniform, short, white; holoptic; eye contiguity about 6-7 ommatidia long. Antenna short, only ⅔ as long as face, brownish black except orange basoventral ½ of third segment, with black pile; arista brown, short, only about as long as third segment; ratio of segments — 1.0 : 1.0 : 2.4. *Thorax:* Black; mesonotum shiny, with short white pile except golden pilose notopleuron, punctate, with punctures small and widely spaced; scutellum shiny, with white pile, punctate, with punctures spaced as on mesonotum but larger; pleuron with white pollen and pile, punctate as on mesonotum; squama white; halter orange. *Legs:* With white pile, orange, except brownish black as follows: Coxa, trochanter, basal ⅔ of front and middle femora, basal ¾ of hind femur, middle ¼ or less of front and middle tibiae, and middle ⅔ of hind tibia. *Wing:* Hyaline, microtrichose, except bare as follows: First and second costal cells, basal ½ of marginal cell, basal ⅕ of submarginal cell, partially on basal ¼ of apical cell, basal ⅓ of discal and cubital cells, anterobasal ⅔ of anal cell and anal lobe, and all of both basal cells and alula. *Abdomen:* Black, except bluish black basolaterally on each tergum, shiny, punctate, with puncturers large (as large as the largest ommatidium) and closely spaced; dorsum with white pile basolaterally on each tergum, with black pile apicomedially on each tergum; venter with white pile. *Terminalia:* Black, with white pile, otherwise as in Figs 9-10.

FEMALE: Similar, except for normal sexual dimorphism, with yellow face and black front.

Puparium: As in Figs 3-4.

SPECIMENS EXAMINED : Holotype male, **Indonesia:** JAVA: Buitenzorg, ii.1900, ex larva feeding on *Aphis coffeae* Nietner (*Zimmermann*) [USNM].

Paratypes 1m 2f; same data as for holotype, 1m 1f [USNM]. **Malaysia:** Pahang, F.M.S., Fraser's Hill, 4200ft, 22.v.1932, 1f (*H.M. Pendlebury*) [AMNH].

DISTRIBUTION : Malaysia (Malay peninsula), Indonesia (Java) [Map 3].

PREY RECORD: The aphid *Toxoptera aurantii* (Boyer de Fonscolombe). This is a new predator record for this important aphid pest of tea and coffee.

REMARKS: The holotype was labeled as "Paragus brachycerus Coq. MS." by D.W. Coquillett. This name has never been validated. As the name is rather appropriate, being a Latin adjective referring to the short antenna, I (FCT) have accepted it. *Paragus brachycerus* and *P. stuckenbergi* are sister-species and form a distinctive species-group defined by the unique aedeagal structure.

Aphis coffeae Nietner is now a junior synonym of *Toxoptera aurantii* (Boyer de Fonscolombe), often a serious pest of coffee and tea. *Paragus brachycerus* is thus a new predator record. Ghorpadé (1981: 76) listed four other species of *Paragus* (besides species of some other genera) recorded as predators of *T. aurantii* from the Indian subcontinent.

Paragus crenulatus Thomson

Paragus crenulatus Thomson, 1869:503. Syntypes m&f, China [NRS]. SUBSEQUENT REFERENCES: Shiraki, 1930: 246 (Taiwan; as synonym of *serratus*); Keiser, 1952: 155 (Sumba, Sumbawa, Rote, Timor; misidentifed as *serratus*); Stuckenberg, 1954b: 408, Figs 17-20 (key reference, description, male terminalia, abdomen; Sarawak, Hong Kong, Java, New Guinea, Sri Lanka, Celebes, India, Malaysia, Thailand); Keiser, 1958: 208 (Sri Lanka); Raychaudhuri *et al.*, 1978: 93 (misidentification as *serratus*; prey from Manipur); Agarwala *et al.*, 1983b: 391 (misidentification as *serratus*; prey from Tripura); Johnson, 1983: 416 (misidentification as *serratus*; prey from Kerala); Datta & Chakraborti, 1986a: 57 (misidentification as *serratus*; Kerala, Tamil Nadu), 1983b: 11 (as *serratus*; misidentification from Sikkim ?).

Paragus crenulatus is the only species of the *serratus*-group that occurs outside of the Indian subcontinent (in China, the Indochinese peninsula, the Malay archipelago, and other continental islands) in the Oriental Region. Dark specimens can be distinguished from *P. yerburiensis* in never being wholly black behind the transverse ridge on the first tergum, in having the base of the fore femur brownish black or black, and in at least the costal cells being suffused with yellowish color. From *P. serratus*, besides the yellow suffused wing base, it differs in having more than the median half of its hind femur brownish black. Distinctions from *P. auritus* are given under that species above. This is a species that is restricted to the humid forested areas, unlike *serratus*, which clearly favours an open, dry, plains habitat.

SPECIMENS EXAMINED : 123m 83f. **India:** BIHAR: 6mi. NE Dhanbad, 250mt, 7.xi.1961, 1m (*E.S. Ross & D.Q. Cavagnaro*) [CAS]; WEST BENGAL: Sundarbans, 12.ii.1976, 1m (*S. Biswas* B4); ASSAM: Nowgong, 21.iv.1974, 2f (*K.D. Ghorpadé* A105) [KGC]; Chabua, 29.xi.1943, 4m 1f (*D.E. Hardy*); same locality & collector, 25.xi.1943, 1m; Tezpur, 24.vi.1943, 1f (*D.E. Hardy*); Doom Dooma, 2.xii.1943, 1f (*D.E. Hardy*) [USNM]; TRIPURA: Telimura, 21.v.1978, 1m (*A. Issar* A9); Baramura, 22.v.1978, 1f (*A. Issar* A10); Kailashahar, 30.v.1978,1m 1f (*A. Issar* A16); MANIPUR: Churchandpur, 915mt, 10.x.1976, 1f (*V.K. Gupta* No. 599); KARNATAKA: Jog falls, 534mt, 18.xi.1976, 1m (*K.D. Ghorpadé* A369); same locality & collector, 19.xi.1976, 1m (A374) [KGC]; Jog Falls, c. 600mt, 19-24.xi.1977, 7m 1f (*Copenhagen Zool. Mus. Exp.*); Mudigere area, c. 900mt, 2-20.xi.1977, 3m 2f (*Copenhagen Zool.Mus. Exp.*) [UZM]; 19km W. Mudigere, 900mt, 6.iv.1980, 1m (*K.D. Ghorpadé* A880); TAMIL NADU: Valparai, 1067m, 5.vii.1982, 1m (*K.D. Ghorpadé* A968); Burliar, 860mt, 22.x.1975, 1m (*K.D. Ghorpadé* A252) [KGC]; KERALA: S. Malabar, Walayar forest, 1500ft, 28.viii.1938, 1m (*P. Susai Nathan*) [IRSNB]. **Sri Lanka:** CENTRAL PROVINCE: Kandy, 28.vi.1953, 1f (*F. Keiser*); Ambacotta, 14.xii.1953, 1m (*F. Keiser*) [NMB]; Peradeniya, 29.vi.1914, 1m [USNM]; Peradeniya Exper. Sta., 14.vii.1953, 1m (*F. Keiser*); Balakuduwa, 18.xii.1953, 1m (*F. Keiser*); NORTHWESTERN PROVINCE: Polgahawela, 6.viii.1953, 1m (*F. Keiser*) [NMB]. Also 38m 42f seen in the collections of the Smithsonian Sri Lanka Project [USNM]. **Nepal:** 9mi. W. Hitaura, 400mt, 23.xi.1961, 1m (*E.S. Ross & D.Q. Cavagnaro*) [CAS]. **Burma:** Shingbwiyang, 16.v.1945, 1m (*L.C. Kuitert*); same locality & collector, 26.v.1945, 1f [SEM]; S. Shan States, Road 40km E. Taunggyi, 1500mt, 2-25.ix.1934, 1m (*R.Malaise*) [ZMUH]. **Thailand:** Chieng Mai Province, Chieng Mai, 300mt, 1.x.1981, 1f (*Copenhagen Zool. Mus. Exp.*); same locality & collectors, 29.ix.1981, 1f; 7km NW. Fang, Horticultural Experimental Station, 30.x.–.xi.1979, 4m (*Copenhagen Zool.Mus. Exp.*); Chiangmai Huai Kaeo Waterfall area, 300mt, 4.xi.1979, 1m (*Copenhagen Zool. Mus. Exp.*); Sam Ngao, at Bhumipol Dam, 6-8.xi.1979, 3m 2f (*Copenhagen Zool.Mus. Exp.*); E. coast Siam Gulf, Paklua, N. of Pathaya, 11-13.xi.1979, 1m (*Copenhagen Zool. Mus. Exp.*); Doi Inthanon Natn Park, Mae Klang Waterfall area, 21.xi.1979, 1m [UZM]; **Malaysia:** Selangor, Templer Park, 1-5.xii.1979, 1m (*P. Nielsen*) [UZM]; Langkawi Is., 26.iv.1928, 1m (*H.M. Pendlebury*); N. Borneo, Kudat, 18.ix.1927, 1f (*C.B. Kloss & H.M. Pendlebury*); same data, 1.ix.1927, 1m [AMNH]; Johore, Sungei Seluyut, 17.ii.1973; 1m (*B.W. Leonard*); Sarawak, Tebedu, 25.vii.1973, 1m 2f (*B.W. Leonard*) [USNM]. **Singapore:** L.Buang Kok, 13.vii.1973, 1f (*B.W. Leonard*) [USNM]. **Indonesia:** SUMATRA: Labuan, Bilik, 2m 2f (*Palm*) [ZMUH]; JAVA: Pekalongan, iv.1907, 1m; Buitenzorg, iii.1909, 1f (*Bryant & Palmer*) [AMNH]; HALMAHEIRA: Jailolo District, Kampung Pasir Putih, 0° 53'N, 127° 41'E, 15-31.v.1981, 1f (*A.C. Messer & P.M. Taylor*) [USNM]. **China:** Macao, 1m 1f (*F. Muir*) [AMNH]. **Philippines** : Negros Or., Mt Talinas, 1000mt, 29-31.xii.1960, 1m (*H.Torrevillas*); Valencia, 300mt, 11-15.i.1961, 2m (*H. Torrevillas*); 1km N. Dumaguete, 5.i.1961, 1m (*H. Torrevillas*); Misamis Or., Balason, 1.iv.1960, 1m (*H.M. Torrevillas*) [USNM]; Mindanao, Maninit Str., Manolo Fortich, Bukidnon, 24.iv.1968, 1m (*M.D. Delfinado*) [AMNH]; Zamboanga del Norte Manucan, 11km SSE., 250mt, 13.x.1959, 1m (*L.W. Quate*); Davao, 1m (*C.F. Baker*); Surigao, 1m (*C.F. Baker*), Dapitan, 1f (*C.F. Baker*) [USNM]; Palawan, Eran Pt, 8km SW. Tarumpitao Pt, 31.xii.1959-4.i.1960, 1m (*L.W. Quate*) [AMNH]; Irawan River, 21km N. Puerto Princesa, 16.iv.1968, 1m (*D.E. Hardy*); 3km NE. Tinabog, 15.v.1962, ex Malaise trap, 1f (*H.Holtman*); Negros, Cuemos Mts, 1m 1f (*C.F. Baker*); Mt Montalban, Rizal Wawa Dam, 150-200mt, 29.iii.1965, 1f (*H.M. Torrevillas*) [USNM]; Montalban, iii.1914, 1m; Basilan, xii.1914, 1f [ZMUH]; Luzon, Guiron, Pilar, Sorsogon, 27.iv.1968, 1f (*M.D. Delfinado*); Luzon, Mt Makiling, 1m 1f (*C.F. Baker*); Manila, 3m 3f (*R.C. McGregor*); same data, xii.1924, 3m; same locality, 27.viii.1945, on blossoms, 1f (*J.L. Gressitt*); Los Baños, 1m 1f (*C.F. Baker*) [USNM]; Manila, 22.viii.1953, 3m (*C.R. Baltazar*); same data, 26.vi.1953, 1m [BPIM]; Los Baños, Laguna, 9.iv.1968, 2m (*R.A. Morse*) [CUIC]; Los Baños, 1f (*Baker*) [MCZ]; Luzon, Manila, 1.vi.1914, 1m; same locality, xi.1914, 2m; same locality, x.1913, 1f (*G.Boettcher*); Luzon, Limay, 26.x.1913, 1m (*G. Boettcher*) [ZMUH]. Taiwan: Takao,

10.vi.1907, 1m (*Sauter*) [ZMUH]. **Vietnam:** no specific locality, x.-xi.1979, 1m 1f (*P. Starý*) [PLC].

DISTRIBUTION: India (Bihar, West Bengal, ?Sikkim, Assam, Tripura, Manipur, Karnataka, Tamil Nadu, Kerala), Sri Lanka, Nepal, Burma, Thailand, China, ?Indochina, Vietnam, Malaysia, (Malay peninsula, N.Borneo), Singapore, Indonesia (Sumatra, Java, Halmaheira), ?New Guinea, Philippines, Taiwan, ?Australia [Map 4].

The above locations (except those with a query) are those from where we have seen actual material of this species. Knutson *et al.* (1975: 327) recorded its occurrence from the "entire Oriental Region; Australia"; it is also recorded from the other Indonesian islands of Sumba, Sumbawa, Rote, Timor and Celebes, and also from Sarawak (Borneo) and Hong Kong (China), *vide* Keiser (1952) and Stuckenberg (1954b).

PREY RECORDS: The aphids *Aphis citricola* van der Goot, A. *craccivora* Koch, A. *gossypii* Glover, A. *nasturtii* Kaltenbach, and *Pentalonia nigronvervosa* Coquerel. See records for these under *Paragus serratus* (Fabricius) in Ghorpadé (1981: 64), and also Agarwala *et al.* (1983b: 391), Johnson (1983: 415) and Raychaudhuri *et al.* (1978: 93). Though credited to *P. serratus* (*s. lat.*), the localities Agartala; Ernakulam, Nilambur and Vellayani (in Kerala); Gauhati; and Moirang (in Manipur), for the above aphid prey are suggestive of *P. crenulatus* being the actual predator involved in these humid places. I (KG) have also identified this species taken feeding on the aphid *Toxoptera aurantii* (Boyer de Fonscolombe) at Cinchona (nr Valparai in Tamil Nadu) by the U.P.A.S.I. staff (see Anonymous, 1981: 89). Specimens reared from *Pentalonia nigronervosa* at Mudigere (in Karnataka) and from *Aphis citricola* and *A. craccivora* at Agartala (in Tripura) were also seen by me recently.

Paragus quadrifasciatus Meigen

Paragus quadrifasciatus Meigen, 1822: 181. Lectotype male, France; designated by Goeldlin de Tiefenau, 1976: 98 [MNHN]. SUBSEQUENT REFERENCES: Kertész, 1910: 6 (catalog citation, synonymy, other references; central and southern Europe); Shiraki, 1930: 246 (Japan, Korea; misidentification); Goeldlin de Tiefenau, 1976: 98 (lectotype designation, description, m & f terminalia, key reference); Datta & Chakraborti, 1984: 246 (unidentified as *Paragus* sp.; flower record from Jammu & Kashmir).

This Palaearctic species is here recorded from the Indian subcontinent for the first time, based on a pair collected in Kashmir. Also, the single male listed as "*Paragus* sp." by Datta & Chakraborti (1984: 246) was examined by me (KG) in ZSI, Calcutta, and found to be *P. quadrifasciatus* Meigen.

SPECIMENS EXAMINED : 2m 1f. **India:** JAMMU & KASHMIR: Kashmir Valley, Tangmarg, c. 2200mt, 17.viii.-7.ix.1978, 1m 1f (*Copenhagen Zool. Mus. Exp.*) [UZM]; Bijbihara, 23.ix.1977, on *Cynodon* sp., 1m (*M. Datta*) [ZSI].

DISTRIBUTION: Palaearctic Region; India (Jammu & Kashmir) [Map 5].

FLOWER RECORD: Datta & Chakraborti (1984: 246) give *Cynodon* sp.

Paragus serratus (Fabricius)

Mulio serratus Fabricius, 1805: 186. Type o?, Tranquebar, India [UZM]. SUBSEQUENT REFERENCES: Kertész, 1910: 6 (catalog citation, references; S. Asia, Sokotra, Sri Lanka, Java); Brunetti, 1908: 52 (Karachi east to Nepal and Calcutta, south to Bangalore), 1913: 158 (Sadiya, Dibrugarh, etc.), 1915: 201 (Kanpur, Calcutta, Rangoon, Pusa), 1923: 31, Pl. I, Figs 6-7 (several localities in Nepal, India, Burma, Java, Sarawak, Papua); Ahmad, 1940: 172 (Kabul Plateau, Afghanistan); Stuckenberg, 1954b: 413, Figs 21-25 (key reference, description, male terminalia, abdomen; Jabalpur, Deesa, Delhi, Poona, Coimbatore, Hasi, Bangalore); Raychaudhri *et al.*, 1978: 93 (misidentification from Manipur); Ghorpadé, 1981: 64 (list of prey from Indian subcontinent; partly misidentified); Agarwala *et al.*, 1983b: 391 (misidentification ?; prey from Tripura), 1984: 18 (prey from India); Johnson, 1983: 416 (misidentification ?; prey from Kerala; Datta & Chakraborti, 1984: 242, Fig. 4a,b (male terminalia, partly misidentifed from Jammu & Kashmir), 1986a: 57 (Karnataka ?, rest misidentified ?), 1986b: 11 (misidentified from Damdin and Rangpo); Singh *et al.*, 1985: 145, Figs 1-6 (male terminalia;? Chandigarh).

As stated under *Paragus auritus* Stuckenberg, some of the subsequent references to "*serratus*" actually apply to other species of the *serratus*-complex, and previous determinations of "*serratus*" are **dubious**, unless confirmed by specimens which could be checked.

This is the smallest and palest species of the *serratus*-complex and is confined to the hot, dry

plains of the subcontinent. Ahmad's (1940: 172) record from the Kabul plateau in Afghanistan needs to be confirmed. From small specimens of *auritus*, it can be separated by its clear wings and brownish black base of the fore femur. The immature stages described by Bhatia & Shaffi (1933: 555-556) are of *P. serratus* (*s. str.*), as verified by their habitus figure (Pl. LXI: f).

I (KG) have also seen an additional 9m 10f [in TNAU], from Coimbatore, Hadagalli and Hagari, collected in all months of the year except in July and August. Some were reared on aphids infesting *Cassia* sp., hyacinth bean (*Lablab purpureus*), "pulses", sorghum, and watermelon (*Citrullus lanatus*). I have also seen the material cited by Datta & Chakraborti (1984: 242-243, Fig. 4a, b) from Jammu & Kashmir, and except for 2m that are of *bicolor* (*q.v.*), the rest are of this species.

SPECIMENS EXAMINED : 91m 76f. **Pakistan:** Cuscoto, 9.vi.1964, 1m 1f [CIBCP]; Rawalpindi, 20.xi.1964, 1m [USNM]. **India:** DELHI: Delhi, University Ridge, 14. ix.1964, 1m (*M. Singh*); UTTAR PRADESH: Hapur Road, 2.iii. 1965, 1m (*V.K. Gupta*) [KGC]; 12mi. SW. Bareilly, 190mt, 29.xi.1961, 1f (*E.S. Ross & D.Q. Cavagnaro*) [CAS]; WEST BENGAL: Calcutta, 20.xii.1908, 1m [USNM]; MADHYA PRADESH: Damoh, 28.i.1967, 1f (*R.S. Gokulpure*); same data, 28.vii.1967, 1f [ILRI]; Gwalior, 28.xi.1981, 1m (*K.D. Ghorpadé* A941) [KGC]; GUJARAT: Anand, 1m 1f (*J.R. Patel*) [IAA]; ANDHRA PRADESH: Potunuru, nr Eluru, xi. 1972, 1f (*K. Durga Prasad*); same data, 3.ix.1975, 1m 1f [KGC]; KARNATAKA: Hagedal, 10km N. Yelburga, 31.x.1972, 1m (*K.D. Ghorpadé*); same locality & collector, 4.xii.1974, 1m (A149), 12.xii.1974, 1f (A162), 14.xii.1974, 1m (A165), 21.xii.1974, 2m (A172), 22.xii.1974, 1m (A173), 23.xii.1974, 2m (A174), 24.xii.1974, 1m (A176), 15.ii.1977, 1m 1f (A395), 18.ii.1977, 1m (A404), 23.xi.1980, 2f (A906), 24.xi.1980, 1m 1f (A908), 26.xi.1980, 1m 1f (A909), 27.xi.1980, 1m 1f (A910); Sandur, nr Bellary, 8.xi.1969, 4f (*K.D. Ghorpadé*); same locality & collector, 29.xi.1980, 3m (A913), 16.vii.1982, 1f (A980); Mudigere, 970mt, 11.xi.1978, 1m (*K.D. Ghorpadé* A727); Bangalore, 916mt, 13.i.1969, 2f (*K.D. Ghorpadé*); same locality & collector, vi.1969, 1f, iv.1970, 1m, xii.1970, 1f, 31.i.1971, 1m, i.1971, 1f, iii.1971, 1f, v.1971, 3m, vi.1971, 3m 5f, 11.vii.1971, 1f, vii.1971, 1m, viii.1971, 3f, xi.1971, 1m, i. 1972, 1m, ii.1972, 8m 7f, vi. 1972, 2m 1f, 19 xi.1972, 1f, 13.iii.1973, 1m, vii.1973, 1m, 10.viii.1973, 1m, 12.viii.1973, 1f, viii.1973, 1m, 23.vii.1975, 3m 1f (A206), 15.i.1976, 1m (A266), 26.i.1976, 2m 1f (A267), 19.ii.1976, 1m (A280), 22.ii.1976, 1m (A284), 10.xii.1977, 1m (A514), 29.xii.1977, 1m (A516), 26.i.1978, 1f (A531), 6.ii.1978, 1m (A539), 24.i.1978, 1f (A545), 24.i.1978, 2m 1f (A547), 24.i.1978, 1f (A548), 25.iii.1978, ex Malaise trap, 1m (A575), 29.iii.1978, ex Malaise trap, 1m (A578), 26.iii.1978, ex Malaise trap, 1m (A585), 11.vi.1978, 1f (A622), 29.xii.1978, 1f (A744), 10.i.1979, 1f (A750), 28.i.1979, *in copula*, 2m 2f (A760), 1.ii.1979, 5m 5f, 7.ii.1979, 1m, 10.ii.1979, 1f, 22.ii.1979, 1f (A762), 1.iii.1979, 1m (A768), 7-9.iii.1979, ex Malaise trap, 1f (A776), 10.iii.1979, 1f (A777), 31.iii.1979, 1m (A783), 15.iv.1979, 1f (A788), 27.iv.1979, 1f (A795), 22.viii.1979, 1m(A831), 10.xi.1979, 1m (A858), 15-20.xii.1979, ex Malaise trap, 1m (A867), 24.ii.1980, 2f (A873), 2.iii.1980, 1m (A874), 24.ix.1980, 1m 1f (A896), 28.ix.1980, 1m 1f (A897), 30.ix.1980, 1m 2f (A898), 2.xi. 1980, 1f (A901), 8.xi.1980, 1f (A902), 30-31.i.1982, 1m (A945), 23.vii.1982, 1f (A985); TAMIL NADU: Coimbatore, 437mt, 29.xii.1973, 1m (*K.D. Ghorpadé* A72) [KGC]; Thanjavur District, Nedungadu, 17.ii.1938, 1m (*P. Susai Nathan*) [IRSNB]; PONDICHERRY; Karaikal, ii.1964, 1m (*P.Susai Nathan*) [AMNH]; same data, x.1963, 2m, iii.1964, 1f; "India", no specific locality, 1m (*G. Angalet*) [USNM].

DISTRIBUTION: ?Afghanistan, Pakistan, India (Jammu & Kashmir, Delhi, Uttar Pradesh, Bihar, West Bengal, Madhya Pradesh, Gujarat, Andhra Pradesh, Karnataka, Tamil Nadu, Pondicherry). Knutson *et al.* (1975: 327) also listed the Indian States of Punjab and Maharashtra in its range, which need to be confirmed. Singh *et al.* (1985: 145) figured the male terminalia of a specimen without indication of locality, but probably from their home town, Chandigarh [Map 6].

PREY RECORDS: The aphids *Acyrthosiphon pisum* (Harris), *Aphis citricola* van der Goot, *A. craccivora* Koch, *A. gossypii* Glover, *Lipaphis erysimi* (Kaltenbach), *Melanaphis sacchari* (Zehntner), *Therioaphis trifolii* (Monell), and *Toxoptera citricidus* (Kirkaldy). It has also been reared from undetermined aphids infesting the following host plants: *Brassica* sp. (mustard), *Cajanus cajan* (red gram), *Centaurea iberica*, *Citrullus lanatus* (watermelon), *Cnicus wallichi*, *Cucumis melo* (melon), *Eleusine coracana* (finger millet), *Emblica officinalis* (Indian gooseberry), *Gossypium* spp. (cotton), *Ipomoea batatas* (sweet potato), *Lablab purpureus* (hyacinth bean), *Rosa* spp. (rose), *Saccharum officinarum* (sugarcane), *Solanum* sp., and *Sorghum bicolor* (sorghum). Also reared from the psyllid *Euphalerus vittatus* Crawford (Homoptera: Psyllidae). See Ghorpadé (1981: 64-65) for references to original literature for the above records.

Agarwala *et al.* (1984: 18) also gave some of the above aphids as prey, and undetermined aphids on the following host plants — *Cicer arietinum* (Bengal gram), *Helianthus tuberosus*, *Panicum* sp., *Sinapis* sp., and *Zea mays* — for "*serratus*", from India.

FLOWER RECORDS: *Anacardium occidentale* (cashewnut), *Mangifera indica* (mango), and *Tridax procumbens*. Datta & Chakraborti (1984: 242-243) give *Ageratum conyzoides*, *Lantana camara*, *Polygonum orientale* and *Solanum nigrum*.

Paragus stuckenbergi Thompson, sp. nov.
(Figs 11, 12)

Length: 4 mm.

MALE: *Head:* Face and frontal triangle yellow, with yellow pile; oral margin and cheek black, bare; vertical triangle black, shiny, except with brownish pollen anterior to anterior ocellus, with black pile except for a few yellow hairs posteriorly; occiput black, with silvery pollen, with white pile ventrally becoming yellowish on dorsal ¼; eye pile uniform, short, white; holoptic; eye contiguity about 6-7 ommatidia long. Antenna short, only ⅔ as long as face, brownish black except orange basoventral ½ of third segement, with black pile; arista brown, short, only about as long as third segment; ratio of segments — 1.0 : 1.0 : 2.4. *Thorax:* Black; mesonotum shiny, with short golden pile, punctate, with punctures small and widely spaced; scutellum shiny, with golden pile, punctate, punctures and spacing as on mesonotum; pleuron with white pollen and pile, with punctures same size as on mesonotum; squama white; halter orange. *Legs:* With white pile, orange except brownish black as follows: Coxae, trochanters, basal ⅔ of front and middle femora, basal ¾ of hind femur, middle ¼ or less of front and middle tibiae, middle ⅔ of hind tibia and apical two hind tarsomeres. *Wing:* Hyaline, microtrichose, except bare as follows: First and second costal cells, basal ½ of marginal cell, basal ⅕ of submarginal cell, partially on basal ¼ of apical cell, basal ⅓ of discal and cubital cells, anterobasal ⅔ of anal cell and anal lobe, and all of both basal cells and alula. *Abdomen:* Black, shiny, punctate, with punctures small (smaller than the largest ommatidium) and widely spaced; dorsum with white pile basolaterally on each tergum, with black pile apicomedially on each tergum; venter with white pile. *Terminalia:* Black, shiny, punctate, with white pile, otherwise as in Figs 11 & 12.

FEMALE: Unknown.

SPECIMENS EXAMINED: Holotype male, **Philippines:** LUZON: Mountain Province, Abatan, Buguias, 60km S. Bontoc, 1800-2000mt, 4.vi.1964 *(H.M. Torrevillas)* [BPBM].

Paratype male, same data as for holotype [USNM].

DISTRIBUTION: Philippines (Luzon) [Map 1].

REMARKS: This species is dedicated to Dr Brian R. Stuckenberg of the Natal Museum, Pietermaritzburg, South Africa, in recognition of his revisionary work on *Paragus* species of the Afrotropical and Oriental Regions.

Paragus yerburiensis Stuckenberg

Paragus yerburiensis Stuckenberg, 1954b: 415, Figs 26-29 (male terminalia, abdomen). Holotype male, Sri Lanka: Velverry [BMNH] (Paratypes also from Jabalpur, India). SUBSEQUENT REFERENCES: Keiser, 1958: 209 (Sri Lanka); Knutson *et al.*, 1975: 328 (catalog citation, Sri Lanka, Madhya Pradesh, Nepal); Patnaik & Bhagat, 1976: 43, Figs 2a-d (as *"Eumerus* sp. nr *albifrons* Walker": misidentification; prey records from Orissa); Ghorpadé, 1981: 65 (prey from Indian subcontinent); Agarwala *et al.*, 1983a: 240 (prey from Kalimpong); 1984: 18 (prey from India).

Paragus yerburiensis is the most distinct member of the *serratus*-complex, with its predominantly black coloration. No other species has the first tergum *entirely* black behind the transverse ridge. Additionally, the wholly pale fore femur and the clear wing are helpful characters to recognize this species. Perhaps most subsequent references to *yerburiensis* were based on correctly identified specimens. The Figs 2a-d in Patnaik & Bhagat (1976) clearly refer to this species, though they listed it as "*Eumerus* sp. nr *albifrons*"!

I (KG) have seen 5m 7f [in TNAU], in addition to the 254m and 98f listed below. These were from Coimbatore, Nathampatti (Ramnad District, Tamil Nadu) and Samalkota, collected in February and from October to December. Some were reared on aphids infesting hyacinth bean (*Lablab purpureus*), orange (*Citrus* sp.), "pulses", red gram (*Cajanus cajan*), and sorghum. The prey records of *Peregrinus maidis* (Ashmead) (Homoptera: Delphacidae) and of *Aphis fabae solanella* Theobald are new.

SPECIMENS EXAMINED: 254m 98f. India: DELHI: Delhi, University Ridge, 15.i.1977, 1m; BIHAR: Ranchi, Namkum, 3.xii.1955, 1f, 8.xii.1955, 1f [KGC]; same locality, 675mt, 8.xi.1961, 1m (*E.S. Ross & D.Q. Cavagnaro*) [CAS]; WEST

BENGAL: Sundarbans, 10.ii.1976, 1f (*S. Biswas* B4) [KGC]; MADHYA PRADESH: Damoh, 13.vii.1968, 1f (*R.S. Gokulpure*) [ILRI]; ANDHRA PRADESH: Potunuru, nr Eluru, 3.ix.1975, 1f (*K. Durga Prasad*); same locality & collector, 7.xii.1975, 2f; Hyderabad, 28.x.1979, ex *Peregrinus maidis* on *Sorghum bicolor*, 1f (*K. Anjaneyulu*); same data, 30.x.1979, 1m; KARNATAKA: Hagedal, 10km N. Yelburga, 585mt, 3.xi.1972, 1m (*K.D. Ghorpadé*); same locality & collector, 9.xii.1974, 2m (A157), 11.xii.1974, 1m (A160), 13.xii.1974, 1m (A163), 14.xii.1974, 1m (A165), 15.xii.1974, 1m 1f (A166), 22.xii.1974, 1f (A173), 24.xii.1974, 1f (A175), 26.xi.1980, 1m (A909), 27.xi.1980, 3m (A910); Ramandrug, 990mt, 16.xi.1974, 1m 1f (*K.D. Ghorpadé* A145 & A146); Sandur, nr Bellary, 8.xi.1969, 4m 2f (*K.D. Ghorpadé*); same locality & collector, 11.viii.1972, 2m, 14.xi.1974, 3m (A143), 12.vii.1978, 2m 1f (A640), 29.xi.1980, 1m (A913) [KGC]; Tarikere area, c. 900mt, 12-17.xi.1977, 1m (*Copenhagen Zool. Mus. Exp.*) [UZM]; Nandi Hills, 1467mt, 28.iii.1979, 7m (*K.D. Ghorpadé* A782); Kodagurki, nr Nandi Hills, 3.xii.1973, 1m (*K.D. Ghorpadé* A45); Bangalore, 916mt, 22.xii.1968, 1m (*K.D. Ghorpadé*); same locality & collector, 13.i.1969, 1f, xii.1969, 4m 4f, i.1970, 3m 4f, ii.1970, 1m 1f, iii.1970, 1m 1f, xii.1970, 5m 2f, vii.1971, 3m, viii.1971, 1f, ix.1971, 1m, x.1971, 5m 1f, 2.i.1972, 1f, ii.1972, 3m 2f, 19.xi.1972, 4m 1f, 4.i.1973, 1f, 19.iii.1973, 1m, viii.1973, 1m, xi.1975, 1f, 14.ii.1979, 3f, 26.x.1973, 3m (A31), 27.x.1973, 1m(A32), 2.xi.1973, 2m (A35), 4.xi.1973, 5m 3f (A36), 13.xi.1973, 1m (A37), 17.xi.1973, 2m (A38), 27.xi.1973, 2m (A39), 27.xi.1973, 1m (A41), 28.xi.1973, 3m (A42), 30.xi.1973, 8m 1f (A43), 6.xii.1973, 1m (A50), 9.xii.1973, ex Malaise trap, 1m (A53), 15.i.1974, 1m (A91), 15.i.1974, ex Malaise trap, 1m (A93), 5.x.1975, 4m (A232), 7.x.1975, 3m (A233), 19.xii.1975, 3m (A265), 15.i.1976, 6m 1f (A266), 26.i.1976, 1m (A267), 19.ii.1976, 1m (A280), 14-22.iii.1976, ex Malaise trap, 1f (A295), 23.ix.1976, 1f (A346), 5.i.1977, 5m (A378), 6.i.1977, 3m (A379), 11.ix.1977, 2m (A463), 15.ix.1977, 1f (A464), 27.ix.1977, 1m (A473), 4.x.1977, 1f (A478); 11.x.1977, 1m 2f (A487), 11-13.x.1977, ex Malaise trap, 1m (A488), 2.xii.1977, 2f (A510), 10.xii.1977, 1m (A514), 29.xii.1977, 2m (A516), 6.ii.1978, 1m (A539), 15.ii.1978, 1m (A550), 18.ii.1978, 2m (A555), 19.ii.1978, ex Malaise trap, 1f (A557), 25.iii.1978, ex Malaise trap, 1m (A576), 24.viii.1978, 2m (A655), 6.ix.1978, 1m (A665), 12.x.1978, 1f (A702), 21.x.1978, 2m (A711), 29.x.1978, 1m (A719), 30.x.1978, ex Malaise trap, 1f (A721), 18.xi.1978, 1f (A733), 19.xi.1978, 1m (A734), 19.xi.1978, 1m 1f (A735), 26.xi.1978, 2m (A736), 20.xii.1978, 2m (A740), 23.xii.1978, 1m (A742), 29.xii.1978, 3m (A744), 29.xii.1978, 2m (A745), 1.i.1979, 1m (A746), 9.i.1979, 1m (A747), 10.i.1979, 1m (A750), 22.i.1979, 1m (A759), 28.i.1979, one pair *in copula*, 1m 3f (A760), 21-22.ii.1979, ex Malaise trap, 1f (A761), 1.iii.1979, 1m (A769), 2.iii.1979, 1m (A770), 25.iii.1979, ex *Aphis fabae solanella* on *Solanum nigrum*, 1m, 21.iv.1979, feeding on honeydew of *Psylla ?simlae* on *Bauhinia racemosa*, 1m (A792), 22.viii.1979, 1f (A831), 25.viii.1979, 2m 1f (A832), 1.ix.1979, 1m (A833), 9.ix.1979, 1m (A834), 1.x.1979, 1f (A836), 22.x.1979, 2m (A851), 27.x.1979, 1m (A852), 10.xi.1979, 2m (A858), 1.xii.1979, 2m (A862), 8.xii.1979, 2m 1f (A864), 8-15.xii.1979, ex Malaise trap, 2m (A865), 5.i.1980, 1m (A871), 24.ii.1980, 2m (A873), 24.iv.1980, 1f (A886), 2.iii.1980, 2m (A874), 24.ix.1980, 2m 1f (A896), 28.ix.1980, 3m 1f (A897), 30.ix.1980, 1m (A898), 5.x.1980, 1m (A899), x.1980, 2m (A900), 19.xi.1980, 1f (A904), 18.xii.1980, 1f (A916), 28.xii.1980, 1m (A917), 4.x.1981, 2m (A928), 30-31.i.1982, 10m (A945), 6.ii.1982, 2m (A946), 21.iv.1982, 1f (A957), 23.vii.1982, 2m (A985), 1.viii.1982, 1m (A993); same locality, Cubbon Park, 4.xi.1979, 1m 1f (*A.R.V. Kumar* No. 165); same locality, Hessaraghatta, ix.1979, 1m (*C. Peter*) [KGC]; same locality, Hebbal, c. 900mt, 26-31.x.1977, 2m 3f (*Copenhagen Zool. Mus. Exp.*); same locality, Allalsandra, c. 900mt, 30.xi.1977, 1m (*Copenhagen Zool. Mus. Exp.*) [UZM]; same locality, 1.xi.1979, 1f (*A.R.V. Kumar* No. 161); Bannerghatta Park, 20km S. Bangalore, 6.i.1974, 1m (*K.D. Ghorpadé* A85); same locality & collector, 27.x.1977, 1m (A494); Ponnampet, Coorg District, 2.iv.1979, 1m (*P.P. Girish*); TAMIL NADU: Yercaud, 1370mt, 4.iv.1976, 1m (*K.D. Ghorpadé* A299); 12 km N. Salem, 22.ix.1978, 1m (*K.D. Ghorpadé* A684) [KGC]; Coimbatore, 1400ft, x. 1963, 1f (*P. Susai Nathan*) [AMNH]; same locality & collector, xii.1963, 1m [USNM]; Nedungadu, Thanjavur District, 28.xi.1938, 1m (*P. Susai Nathan*); same locality & collector, 1.xii.1938, 1m 1f [IRSNB], 10.i.19(?), 3f, 26.i.19(?), 1f, 1-5.ii.19(?), 1m,2.ii.19(?), 1m, 7.viii.19(?), 1f, 30.xi.19(?), 2m, 5.xii.19(?), 1m 1f, 15.xii.19(?), 4m [MCZ]; PONDICHERRY: Nittapakkam, x.1963, 1m (*P. Susai Nathan*) [AMNH]; Karumbagaram, Karaikal Territory, 17.ii.19(?), 1m (*P. Susai Nathan*); KERALA: Walayar forest, 31.xii.1973, 1f (*K.D. Ghorpadé* A74) [KGC]. **Sri Lanka:** CENTRAL PROVINCE: Dambulla, 6.ii.1954, 1f (*F.Keiser*); NORTHERN PROVINCE: Mankulam, 26.i.1954, 1m (*F. Keiser*); Mannar, 31.i.1954, 1f (*F. Keiser*); Elephant Pass, 26.i.1954, 1f (*F. Keiser*); NORTHWESTERN PROVINCE: Puttalam, 13.i.1954, 1f (*F. Keiser*) [NMB]. Also 14m 9f seen in the collections of the Smithsonian Sri Lanka Project [USNM].

DISTRIBUTION: India (Delhi, Uttar Pradesh, Bihar, West Bengal, ?Assam, Madhya Pradesh, Orissa, Andhra Pradesh, Karnataka, Tamil Nadu, Pondicherry, Kerala), Nepal, Sri Lanka [Map 7].

PREY RECORDS: The aphids *Aphis citricola* van der Goot, *A. craccivora* Koch, *A. fabae solanella* Theobald, A. *gossypii* Glover, *Brevicoryne brassicae* (Linnaeus), *Lipaphis erysimi* (Kaltenbach), *Melanaphis sacchari* (Zehntner), *Myzus persicae* (Sulzer), *Rhopalosiphum maidis* (Fitch), *Toxoptera aurantii* (Boyer de Fonscolombe), *T. citricidus* (Kirkaldy), *T. odinae* (van der Goot), and *Uroleucon compositae* (Theobald), besides undetermined aphid species infesting the following host plants: *Cajanus cajan* (red gram), *Citrus* sp. (orange), *Lablab purpureus* (hyacinth bean), and *Sorghum bicolor* (sorghum) [see Ghorpadé (1981:65); and Patnaik & Bhagat (1976:45) — misidentified as *"Eumerus* sp. nr *albifrons"*)]. Also on the delphacid *Peregrinus maidis* (Ashmead), which, along with *Aphis fabae solanella*, is a new prey record. This is the first

record of a Delphacidae prey for any species of *Paragus*.

FLOWER RECORDS: *Ageratum conyzoides*, *Anacardium occidentale* (cashewnut), *Euphorbia hirta*, *Guizotia abyssinica* (nigerseed), *Mangifera indica* (mango), *Mimosa pudica*, and *Vicoa indica*.

Graptomyza latiuscula (Walker), comb. nov.

Paragus latiusculus Walker, 1861:266. Lectotype female, Tond, Celebes; here designated [BMNH: examined].

This species was described as a *Paragus* and was listed as an unplaced species of that genus in the Oriental Diptera Catalog (Knutson *et al.*, 1975:328). A single female type, present in the BMNH collection, is here designated by me (FCT) as the lectotype. It is a species of *Graptomyza* Wiedemann (Syrphidae: Eristalinae: Volucellini).

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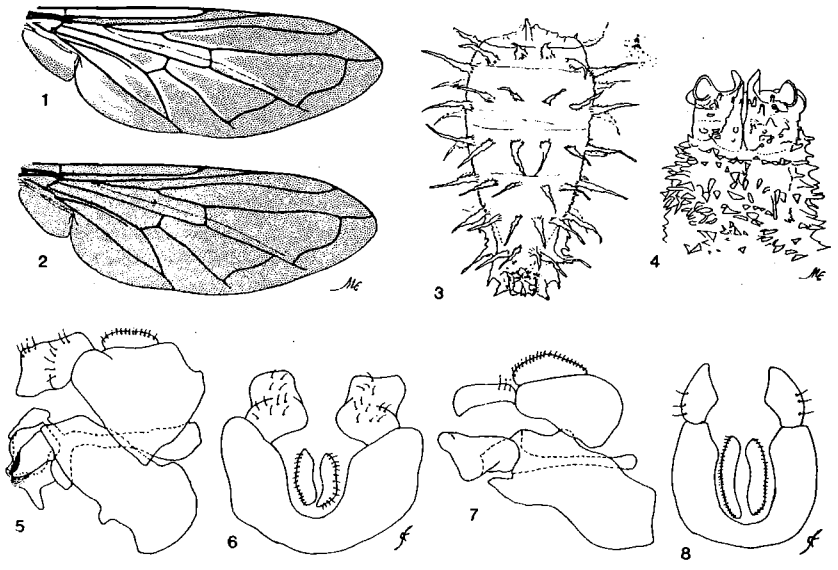
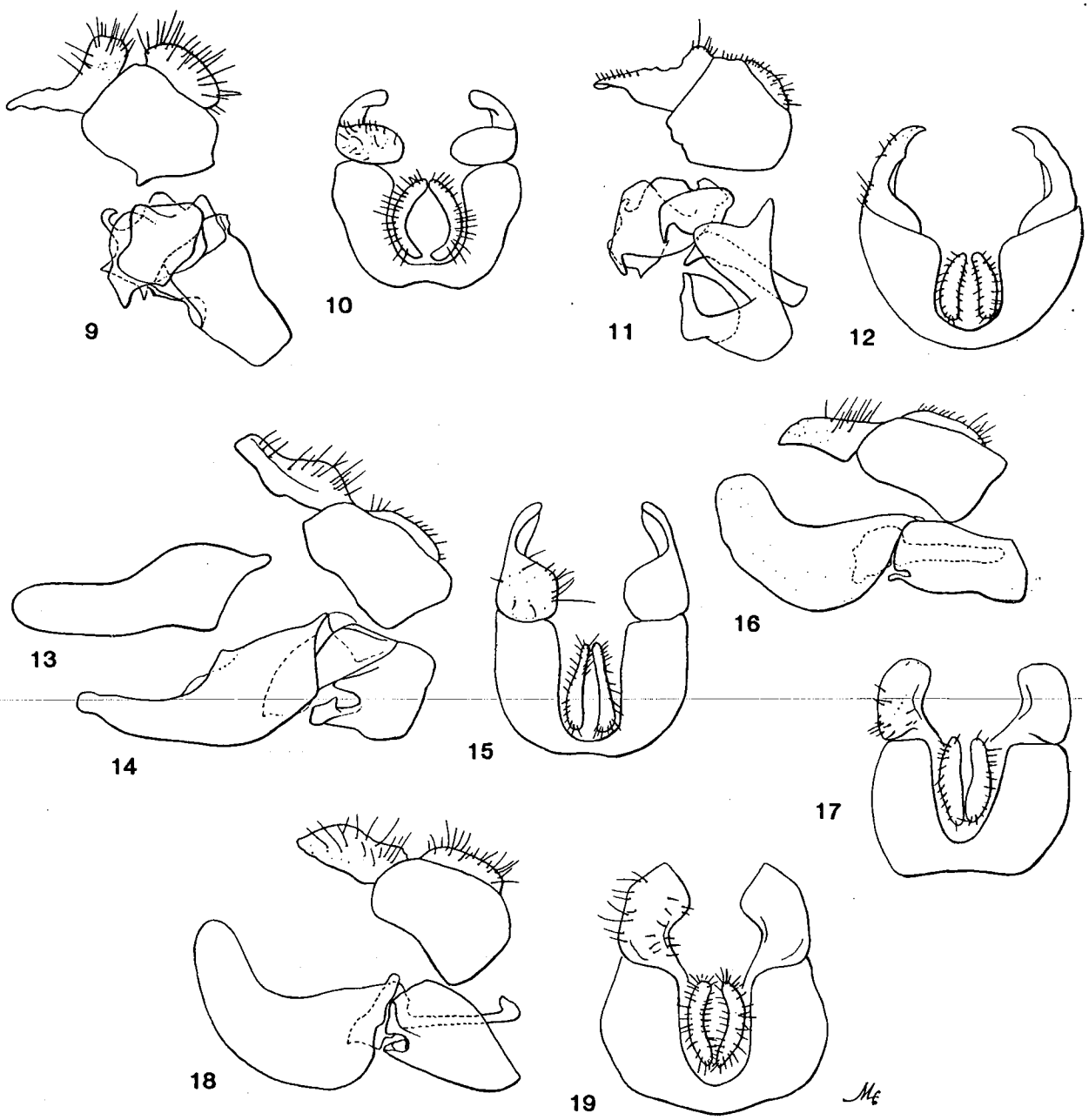
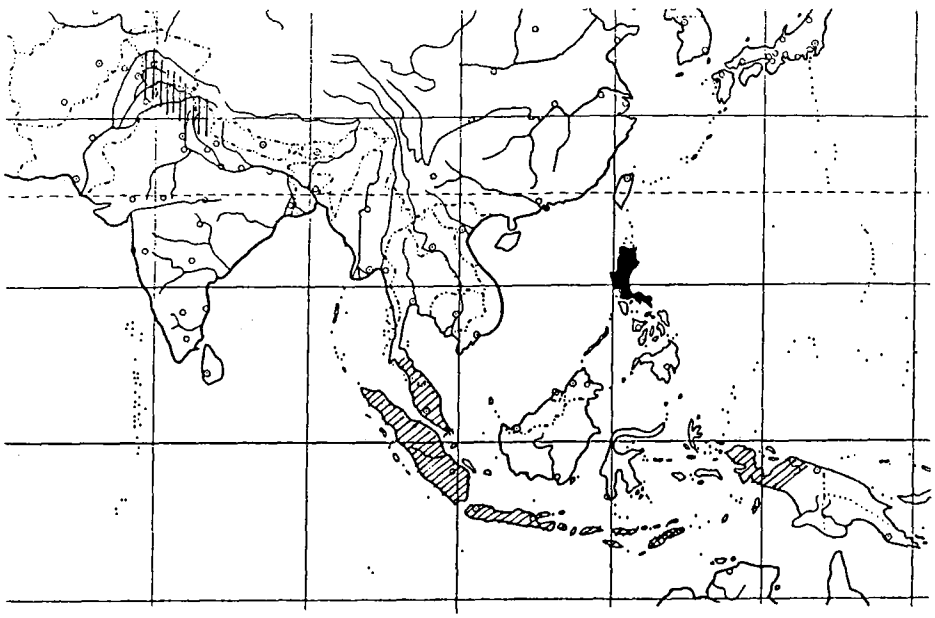


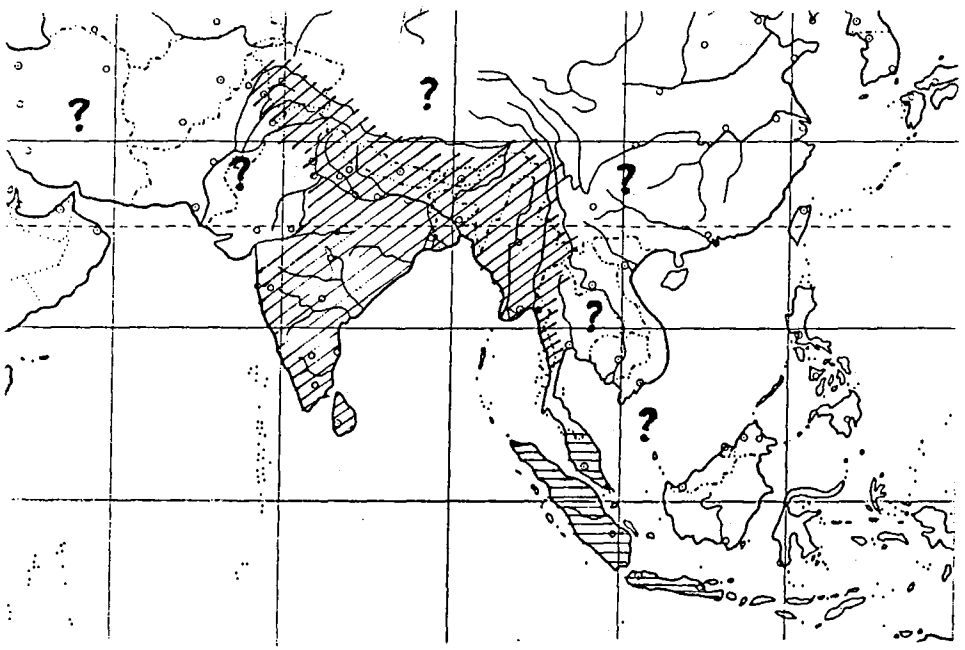
Figs 1-8. Wings. (1) *Paragus politus* Wiedemann; (2) *Paragus villipennis* Thompson, sp. nov. Puparium. (3-4) *Paragus brachycerus* Thompson. sp. nov.: (3) dorsal view; (4) hind spiracular process, dorsal oblique view. Male terminalia. (5-6) *Paragus annandalei* Ghorpadé, sp. nov.: (5) lateral view; (6) dorsal view, of tergum 9 and surstylus. (7-8) *Paragus rufocinctus* (Brunetti): (7) lateral view; (8) dorsal view.



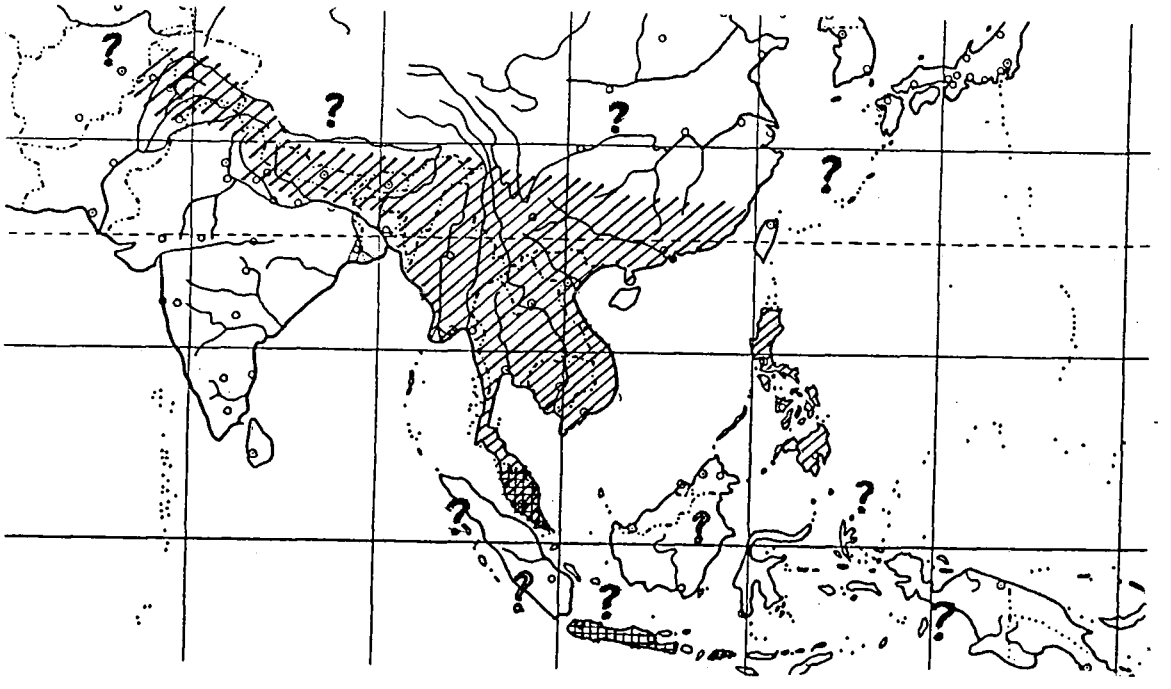
Figs 9-19. Male terminalia. (9-10) *Paragus brachycerus* Thompson, sp. nov.: (9) lateral view;(10) dorsal view. (11-12) *Paragus stuckenbergi* Thompson, sp. nov.: (11) lateral view; (12) dorsal view. (13) *Paragus atratus* de Meijere, lateral view of paramere. (14-15) *Paragus goeldlini* Thompson, sp. nov .: (14) lateral view; (15) dorsal view. (16-17) *Paragus villipennis* Thompson, sp. nov.: (16) lateral view; (17) dorsal view. (18-19) *Paragus politus* Wiedemann: (18) lateral view; (19) dorsal view.



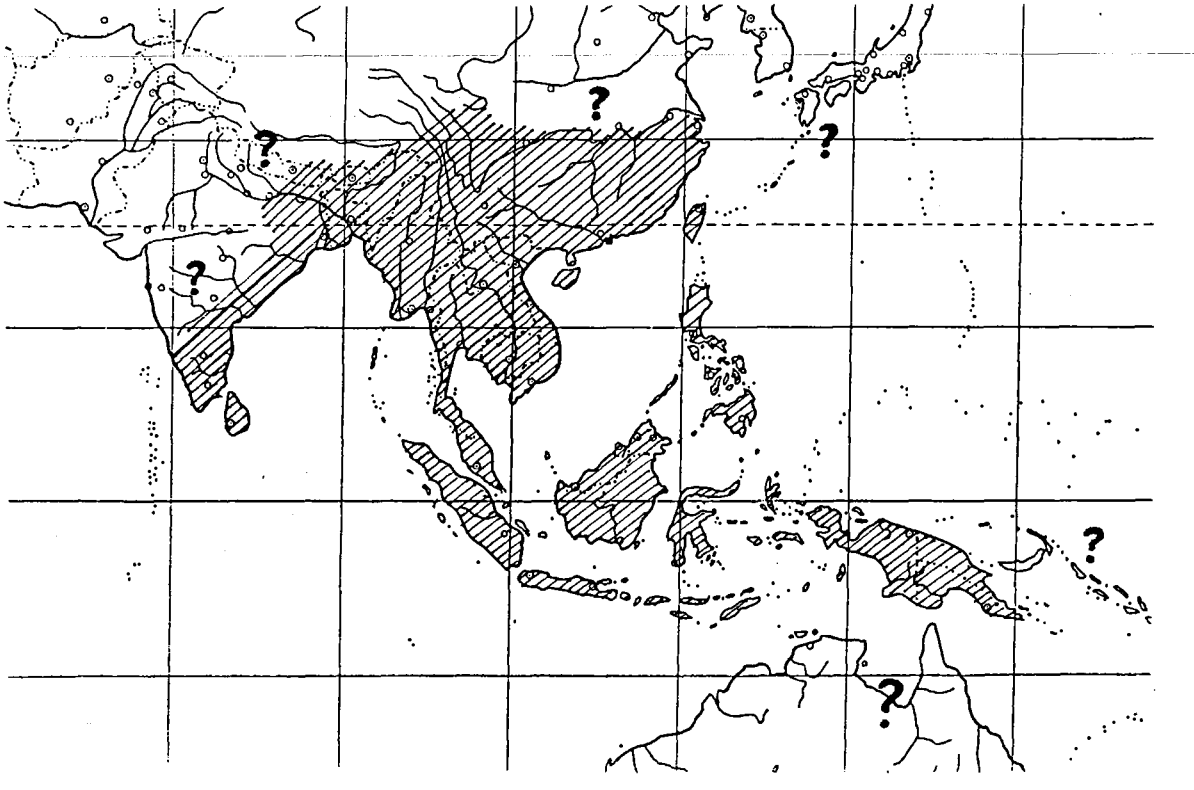
Map 1. Spatial distribution of *Paragus*: *atratus* de Meijere, *goeldlini* Thompson, *annandalei* Ghorpadé, *stuckenbergi* Thompson.



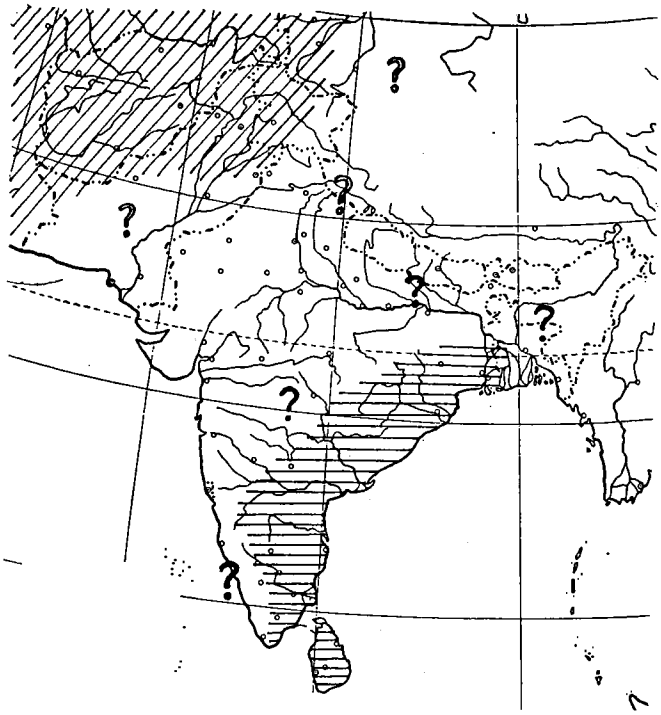
Map 2. Spatial distribution of *Paragus*: *rufocinctus* (Brunetti), *villipennis* Thompson.



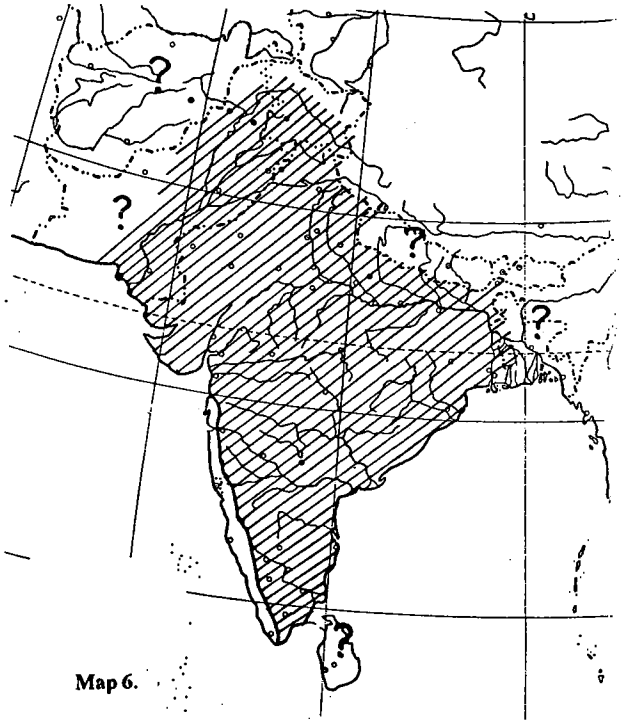
Map 3. Spatial distribution of *Paragus*: ▨ *politus* Wiedemann, ▦ *brachycerus* Thompson.



Map 4. Spatial distribution of *Paragus crenulatus* Thomson.



Map 5.



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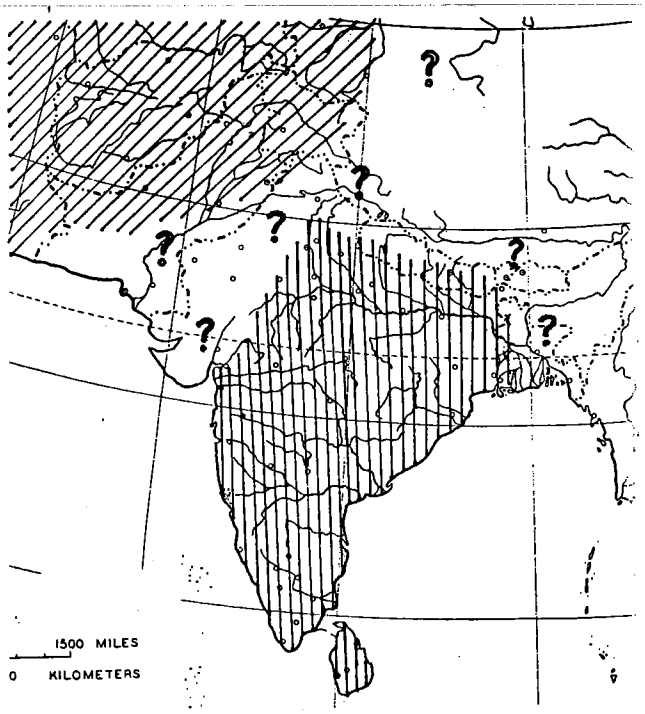

Map 7.

Map 5. Spatial distribution of *Paragus* : *auritus* Stuckenberg, *quadrifasciatus* Meigen.

Map 6. Spatial distribution of *Paragus serratus* (Fabricius).

Map 7. Spatial distribution of *Paragus* : *bicolor* (Fabricius), *yerburiensis* Stuckenberg.