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In the footsteps of H. G. Champion: New Dianous species from the Himalaya (Coleoptera, Staphylinidae)

by **G. M. de Rougemont** [1]

Abstract: Observations on the bionomics of members of the genus *Dianous* are given together with a list of species collected by the author in 1980–81 in the Himalaya, including the descriptions of 8 new taxa: *D. bhutanensis* n. sp., *D. inconspicuus* n. sp., *D. viridicupreus* n. sp., *D. nepalensis* n. sp., *D. wittmeri* n. sp., *D. miripes* n. sp., *D. gregarius* n. sp. and *D. margaretae* n. sp.

Key words: Coleoptera Staphylinidae – Himalayan *Dianous* – bionomics – descriptions.

Introduction

During the last years of the first world war H. G. Champion, a young officer of the ICS with an interest in entomology, discovered a few examples of Dianous in the lower reaches of streams in Almora District, Uttar Pradesh. Guessing correctly that these insects were strays from the cascades and waterfalls further upstream, he set about exploring that biotope with remarkable success, enabling his father, C. G. Champion to describe more than 20 new species (only 6 species were recognised from the whole world at that date, although some others, members of the nigrovirens group, were described as *Stenus*). A few others were encouraged to persue the investigation, including H. M. Lefroy who collected in the Darjeeling area, S. N. Chatterjee in Assam, and lastly the systematist M. Cameron, whose post as a ship's doctor enabled him to visit both Uttar Pradesh and the Darjeeling area, with the result that by the time of the last war and Indian independance 45 species were known from India alone. Many collectors have visited the Himalaya in recent years, but have largely ignored the cascades habitat, so that only occasional specimens of *Dianous* have been added to collections. I recently undertook the prospection of this biotope, in the little time I could spare from professional duties, first in SE Asia and then in the localities listed in this paper. A consistent proportion of about 30%

[1] 12th contribution to the knowledge of Staphylinidae.

of new taxa among the *Dianous* I obtained shows that this remains a fruitful field for research. The scenic beauty of typical localities contributes to male field work an exhilarating if sometimes arduous exercise. Since no sampling techniques are appropriate, success depends on the meticulous search for individual insects. The most effective technique devised is to splash the rock faces in a stream in order to dislodge the insects from fissures or moss, and then capture them with an aspirator. Access to suitable boulders often entails wading, sometimes waist-deep, in cold mountain torrents, and the collector must resign himself to being soaked for hours by the heavy spray from waterfalls. Home and dry, however, he will find taxonomic work much facilitated by the recent revision of the genus in 2 parts by Puthz (1980, 1981).

Notes on the States and localities visited

Bhutan: The only substantial collection of beetles from this country was made by members of the May 1971 Basel Natural History Museum Expedition. It included a good number of *Stenus* species, but only a single *Dianous*, whereas when I visited the country in October, I obtained 8 species of Dianous but only a single *Stenus* species: *S. viridanus* Champ., which not only bears a close superficial resemblance to *Dianous*, but shares it's bionomics. Although disappointing, this result was not unexpected, for in October, the heavy monsoon of the eastern Himalaya is scarcely over, and *Stenus* imagines are not to be found in theses conditions. The southern border of Bhutan follows the line of mountains which rise abruptly from the Brahmaputra valley at an altitude of ca. 150 m, and provides a remarkable example of a sharp faunal barrier. The collections made by the Basel Expedition at Phuntsholing and by I. Löbl at Manas on the Assam border show how a rich montane fauna, including *Dianous* spp., thrives at only 200 m altitude, whereas in areas where the main Himalayan massif is seperated from the plains by ranges of foothills these elements are only found at much higher elevations.

Uttar Pradesh and Himachal Pradesh: In view of their size, these two States of the Union of India are each treated here with the same zoogeographic value as the other, independant States. The former, which used to be known as the United Provinces, continues to be refered to by

the same abbreviation: UP, and is the source of most of the early collections of montane beetles in India, from Kumaon, Almora, Ranikhet, Dehra Dun, Mussoorie etc. The neighbouring State, abbreviated HP, was formerly part of the Punjab; most early collections were made in the Simla area and at localities in the upper Beas (Kulu) valley. During my brief visits to these two places and to Dharmsala in June 1981, during which I collected 11 species of *Dianous* not a single *Stenus* was found: exceptional heavy rains in May that year had induced the monsoon diapause which was also evident in Nepal in August 1980.

Kashmir: Apparently ideal biotopes were prospected in several localities surrounding the Vale of Kashmir, both in the eastern and in the southwestern (Pir Panjal Range) mountains, without success. At altitudes between 1700 and 2500 m, a rich zone for *Dianous* in the Himalayan foothills, these insects were absent. Instead their biotope is occupied by *Geodromicus* and *Lesteva* species, which in Nepal, HP etc. only occur at higher elevations. I assume that the reason for this is topographical: Only one river, the Jhelum, drains out of the Valley towards the West, an area which is poor in species of *Dianous*. The Valley is otherwise isolated from the foothills by the Pir Panjal and Murbal ranges, which constitute a barrier to the expansion of these medium-altitude species.

Units of measurements, made with an eye-piece micrometer at × 80 magnification, are equal to 12.5 microns, except in the case of the total body length of insects, which is given in mm.

Systematics

Dianous bhutanensis n. sp. Figs 1, 8.

Length: 4.8 mm. Black, the head, pronotum, elytra and the transverse anterior depressions of abdominal tergites cyaneous; appendages pitch black, the basal segments of palpi, antennal clubs and tarsi somewhat paler. Puncturation coarse, confluent on fore-body, the pubescence whitish. Integument without apparent microsculpture.

Head broader than elytra (79: 75), the vertex broad (average distance between eyes: 43), slightly prominent between eyes and median depression, it's puncturation coarse, especially on median axis, the diameter of punctures exceeding that of third antennal segment, the interstitial rugae tending to longitudinal confluence. Antennae moderately

long, the terminal segment easily overlapping the base of pronotum when reflexed; antennal segments: I: 10; II: 9.5; III: 20; IV: 14; V: 11; VI: 11; VII: 10; VIII: 8; IX: 9; X: 9.5 (breadth: 4.5); XI: 11.

Pronotum elongate (62: 58), the sides markedly sinuate in posterior third, the puncturation coarse, confluent, the rugae forming a transverse ellipse on disc.

Elytra fairly convex, subquadrate (Length: 76, breadth: 75), their puncturation coarser than that of pronotum, confluent, forming mostly transverse rugae on disc.

Abdomen cylindrical, the tergites particularly convex between borders, scarcely narrowed to apex; puncturation and pubescence fine and dense; paratergites of segment IV about as broad as second antennal segment, densely punctate. Sternite IX: figure 8.

Tarsal segments: I: 33; II: 10; III: 8; IV: 5; V: 18. All fourth segments simple.

Male: sternites III-VI without special characters; sternite VII with dense and fine puncturation and pubescence on apico-median portion; sternite VIII with a round shallow emargination to about 1/7th the length of sternite; aedeagus: figure 1.

Holotype ♂ (coll. Rougemont): Bhutan, Phuntsholing, ca. 300 m, running on dry rock face in a small stream, X.1980, G. M. de Rougemont.

Dianous bhutanensis n. sp. runs to *D. flavicoxatus* (Bck.) from Sumatra in Puthz' key (1981, p.100). It differs from that species by it's colour (steelblue, not suffused with coppery-purple), by the more shallow depression of the vertex which is also more closely punctured, becoming longitudinally confluent, the slightly finer and more confused sculpture of the pronotum and elytra, coarser and closer abdominal puncturation, longer tarsi, and by the shape of the median lobe of the aedeagus. The new species is also similar to *D. hirsutus* Rougemont, but lacks that species' characteristic dense pubescence, has darker legs and sparser abdominal puncturation, and the male sexual characters are different: in the new species sternite VII does not bear prominent divergent keels, and the apical emargination of sternite VIII is shallower.

Dianous bracteatus (Champ.)

Stenus bracteatus Champion, 1920, Ent. Mon. Mag. 56: 173.
Dianous bracteatus Puthz, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 108, Fig.

Material studied: Nepal: Bagmati Prov., road between Kathmandu and Kakani, ca. 1800 m running on boulders in shallow stream, 25.VIII.1980, G. M. de Rougemont

(1 ♂ and 2 ♀). Indien: HP, Bagsunath Cascades, Macleodganj, Dharmsala, in mossy fissures in rock face near cascade, with *D. nigrovirens* Fv., VI.1981, G. M. de Rougemont (3 ♂ and 3 ♀); HP, Simla, VI. 1981, G.M. de Rougemont (1♂).

This species was described from the UP; it is new both to Nepal and to Himachal Pradesh.

Dianous viriditinctus (Champ.)

Stenus viriditinctus Champion, 1920, Ent. Mon. Mag. 63, 6: 104.
Dianous viriditinctus Puthz, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 108, Fig.

Material studied: Bhutan: 5 km S. of Chasilakha, ca. 2000 m, on mossy boulder in spray of waterfall, X.1980, G. M. de Rougemont (1 ♂); Bhunakha, in wet moss in spray of waterfall among a large colony of *D. aereus* Champ., X.1980, G. M. de Rougemont (1 ♀). Nepal: Umg. Lughla, Khumbu, H. Franz (1 ♀). India, HP, Vashisht, upper Beas Valley, in wet moss in fissures of rock face in a stream, VI.1981, Rougemont (20 ex.).

Also previously only known from the UP, therefore new to Bhutan, Nepal and Himachal Pradesh. The Bhutanese exx. and that from Nepal are darker in colour, with scarcely visible metallic reflex, and with coarser sculpturation of the fore-body than the NW Indian specimens, but the dark legs, distinctive aedeagus and male ninth sternite leave no doubt about their identity.

Dianous inconspicuus n. sp. Figs 2, 9.

Length: 4.7–5 mm. Black, without metallic reflex, palpi and legs testaceous, the apices of femora slightly darkened; antennae rufous; pubescence of clypeus whitish, that of abdomen and of ventral surfaces golden; puncturation of fore-body very coarse and rugose, but nowhere forming linear rugae. Surfaces without evident microsculpture.

Head narrower than elytra (70: 74), about equal to the latter between humeral angles, the vertex broad (average distance between eyes: 40), evenly depressed to the median line on which punctural interstices are broader, giving the impression of a narrow, irregular impunctate channel; the diameter of punctures is about equal to that of third antennal segment, the interstices extremely narrow, the surface thus rugose. Antennae fairly short, when reflexed overlapping the base of pronotum by less than the length of terminal segment; antennal segments: I: 10; II: 8; III: 17; IV: 11; V: 10; VI: 9; VII: 9; VIII: 7; IX: 7; X: 8 (breadth: 5); XI: 10; the three terminal segments form a distinct club.

Pronotum elongate (58: 52), broadest at the middle, feebly sinuate posteriorly, the puncturation even, not coarser than that of head.

Elytra slightly elongate (78: 74; length of suture: 69), very convex, with puncturation equal to that of head and pronotum on disc, but the interstices becoming thicker and slightly confused on sides.

Abdomen cylindrical, scarcely tapered (breadth of segment III (measured from outer margins of paratergites): 52; breadth of segment VII: 50). Paratergites broad (3–4), sparsely and coarsely punctured; puncturation of tergites coarse in anterior transverse depressions, extremely fine, and dense on posterior halves, but a little coarser and sparser on tergite VIII.

Metatibia only a little longer than the tarsi (65: 55); tarsal segments: I: 22; II: 10; III: 7; IV: 5; V: 10; all fourth segments simple.

Male: Sternites V and VI slightly flattened and more sparsely punctured in apico-median areas; sternite VII with a well delimitated, slightly concave apico median area covered in fine and dense puncturation and pubescence; sternite VIII with a broad triangular apical emargination extending to one third the lenght of sternite; sternite IX: figure 9; adeagus: figure 2, the apex of median lobe slightly deflexed.

Types: Holotype ♂ and 2 paratypes (1 ♂ and 1 ♀, coll. Rougemont): Bhutan, Khamjee, 850 m, on mossy boulder opposite cascade, X.1980, G. M. de Rougemont.

This new species most closely resembles *D. semicoeruleus* (Cam.), described from Malaya, in habitus, size and puncturation. It differs most notably from that species by it's colour, without a metallic reflex, at most a faint brassy tinge, as opposed to the blue of *D. semicoeruleus*, by the less heavily infuscate apices of femora, and the finer puncturation of the abdominal tergites. The paratergites are sparsely punctured as in *D. semicoeruleus*, but the punctures are coarser. The outline of the median lobe is similar, but more acute in the new species. In Puthz' key (1981) it runs to *D. semicoeruleus* and *D. shan* Rougemont ("species 4 Rougemont" in that key), or, according to the interpretation of the relative breadths of head and elytra, to *D. reformator* Rougemont; from both these species it is easily distinguished by it's colour, coarser and more regular puncturation, and by the sexual characters.

Dianous iridicolor (Scheerp.)

Stenus iridicolor Scheerpeltz, 1976, Khumbu Himal 5: 102.
Dianous iridicolor Rougemont, 1980, Ent. Basil 5: 180.
Dianous iridicolor Puthz, 1981, Ent. Abh. Mus, Tierk. 44 (6): 104.

Material studied: Nepal: Prov. Bagmati, Malemchi, 2800 m, 16.IV.1981, I. Löbl & A. Smetana (1 ♂ and 2 ♀); Bagmati Prov., Shivapuri, 2700 m, under cut tree trunk in forest, 24.III.1982, G. M. de Rougemont (1 ♂).

This beautiful species is only known from Nepal, where, with the following three species and a further recently described species, *D. martensi* Rougemont it forms a group characterised by their brilliant metallic bodies and by their bionomics: unlike other *Dianous* spp. they do not inhabit the banks of streams or cascades, but are found at relatively high altitudes, often in the company of *Stenus (Parastenus)* species, under stones in alpine pastures or in humus. The ex. of this species cited from Kathmandu Valley by Scheerpeltz almost certainly comes form the surrounding hills and not from the valley itself.

Dianous viridicupreus n. sp. Figs 3, 10.

Length: ca. 5mm. Labrum black, the rest of the fore-body a brilliant metallic light green, suffused in parts, especially the anterior and posterior borders of pronotum and abdomen, with a cupeous reflex; first four visible segments of abdomen a slightly darker green than the fore-body, the terminal segments black with only a faint greenish reflex; bases of palpi pale testaceous, the second and third segments progressively broadly infuscate; antennae rufous; basal halves of femora pale testaceous, the rest of legs infuscate, the demarcation of colours sharp. Surfaces of body shiny, without visible microsculpture.

Head much broader than elytra (83: 72), the frons deeply but not broadly depressed in median axis, the sides, especially posteriorly, convex between eyes median depression. The puncturation is very coarse, the diameter of punctures greater than that of third antennal segments, almost rugose, not confluent, the very fine pale pubescence long and erect. Antennae when reflexed are short of the base of pronotum by the length of terminal segment, their total length 110.

Pronotum: 67: 57, broadest 3/7ths form base, just before the lateral sinuate constriction. Puncturation similar to that of head, not confluent.

Elytra subquadrate, the humeral angles acute but narrow (distance between these: 60), the sides constricted between the humeral angles and the broadest point which is situated about 2/3rds from their base; suture short (60), so that the combined posterior border is quite strongly arcuate. The punctures are of equal size to those of pronotum, but the interstitial rugae are moderately confluent in the usual pattern over much of the surface.

Abdomen subcylindrical, feebly tapered, with fine shallow puncturation. Paratergites IV: 4, or about the breadth of the first antennal segment, their puncturation coarser and denser than that of

tergites. Sternite IX with prominent, rounded and denticulate apicolateral angles.

Legs: Length of protarsi: 37, the fourth segment distinctly dilated; metatibia: 78; metatarsi: 71; metatarsal segments: I: 31; II: 10; III: 9; IV: 7; V: 16; the fourth segments are not dilated, although slightly produced ventrally.

Male: Sternite VIII (Fig. 10) with a deep, acute, bi-sinuate excision. Aedeagus (Fig. 3) characteristic, the apical mucron with a small ventral tooth and very fine short pubescence.

Holotype ♂ (coll. Rougemont): Nepal, Bagmati Prov., Shivapuri, 2800 m, under stone on damp cropped pasture in forest clearing, 24.III.1982, G. M. de Rougemont.

D. viridicupreus n. sp. runs in PUTHZ' key to *D. bracteatus* (Champ.), from which it can easily be distinguished by it's greater size, clearly bicolorous legs, brighter metallic body surface, and by the male sexual characters. It is closest in appearance to *D. nepalensis* n. sp., differing in it's longer tarsi, brighter colour, smaller elytra with narrower shoulders, and by the aedeagus, which shows that both these species are probably more closely related to *D. nigrovirens* (Fv.) than to the other metallic humicolous species. From *D. martensi* Rougemont the new species differs by it's narrower elytra, longer protarsi, finer and denser puncturation of the abdominal tergites, differently shaped ninth sternite, more deeply depressed basal region of the head, the pronotal puncturation which is not confluent, sharper demarcation of the infuscation of legs, and by the male sexual characters, including the much deeper emargination of the eighth sternite and the ventrally toothed apex of the median lobe. *D. iridicolor* (Scheerp.) has much broader elytra which are suffused with dark blue, a generally broader build, longer tarsi and different sexual characters.

Dianous nepalensis n. sp. Figs 4, 11.

This species runs to *D. tonkinensis* (Puthz) in that author's key, but more closely resembles the preceding species, *D. viridicupreus* n. sp. A detailed comparison with the latter is made for it's diagnosis.

Body an obscure metallic greenish bronze; palpi testaceous, the third segment apically infuscate; antennae rufous, not darkened apically; legs rufous, the apical halves of femora infuscate. All surfaces except tenth tergite devoid of microsculpture. Puncturation of pronotum and elytra not confluent, on elytra with only a few short rugae on disc.

Proportions of Holotype: Length: ca. 5 mm; breadth of head: 79; length of antennae: 96 (not extending to the base of pronotum when reflexed); length of pronotum: 62; breadth of pronotum: 52; maximum length of elytra: 80; breadth of elytra: 72; metatibia: 79; metatarsi: 62; metatarsal segments: I: 31; II: 10; III: 7; IV: 5; V: 11.

Male: Sternite VII with a small, shallow apical emargination; sternite VIII with a deep, sinuate excision; aedeagus (Fig. 4) with characteristic inner-sac and a tooth on the ventral face of the apical mucron of the median lobe, which bears an extremely fine, short pubescence.

Holotype ♂ (coll. Rougemont): Nepal, Bagmati Prov., Sundarijal Cascades, in moss, 24.III.1980, G. M. de Rougemont.

The shape of the male eighth sternite and the toothed apical mucron of the median lobe show that like *D. viridicupreus* n. sp., *D. nepalensis* n. sp. is probably related to *D. nigrovirens* (Fv.). Compared with an ex. of the latter from Himachal Pradesh (see below), *D. Nepalensis* differs most noticeably by the coarser and not confluent puncturation of the fore-body, lighter appendages, especially the antennse, narrower elytra and generally lesser size. From *D. viridicupreus* n. sp. it differs, apart from the characters of the aedeagus, by it's darker, less brilliant and unicolorous for-body, more broadly depressed median portion of frons, especially in posterior region, by it's longer elytra which are not at all confluently punctate, by the sparser puncturation of paratergites, and it's shorter tarsi.

Dianous n. sp.

Material studied: Nepal: Khandbari District, For, above Ahale, 2300 m, 26.III.1982, A. & Z. Smetana (1 ♀, coll. Smetana)

This micropterous insect closely resembles the preceding two species, and more particularly *D. viridicupreus* n. sp. It differs from both by it's much coarser puncturation of the fore-body. Because too little is yet known of the range of variability of species within this group a diagnosis based solely on external characters might be misleading, so it is not proposed to describe this species until more material becomes available.

Dianous cyanovirens (Cam.)

Stenus cyanovirens Cameron, 1930, Faun. Brit. Ind., Col. Staph. 1: 335.
Dianous cyanovirens Puthz, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 106.

Material studied: Bhutan: Lemjelum Waterfall, near Thinley Gang, X.1980, G. M. de Rougemont (18). Nepal: Bagmati Prov., Sundarijal Cascades, in fine moss on boulders in stream, 24.VIII, X.1980, G. M. de Rougemont (3 ♂ and 8 ♀).

Described from Assam; this species is new both to Bhutan and to Nepal.

Dianous aurichalceus(Champ.)

Stenus aurichalceus Champion, 1920, Ent. Mon. Mag. 56: 172.
Dianous aurichalceus Puthz, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 106.

Material studied: India: HP, Bagsunath Cascades, Macleodganj, Dharmsala, VI.1981, G M. de Rougemont (18). HP, Vashisht, Beas Valley, VI.1981, G. M. de Rougemont (18).

This species was already known from the Beas Valley (several ex. in BMNH) and from Pakistan. It is doubfully cited by Puthz from Bhutan.

Dianous nigrovirens (Fv.) Fig. 7.

*Stenus nigrovirens*Fauvel, 1895, Rev. d'Ent. 14: 206.
Dianous nigrovirens Puthz, 1969, Bull. Inst. r. Sc. Nat. Belg. 45 (9): Figs 35, 36.
Dianous nigrovirens Puthz, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 108.

Material studied: India: HP, Bagsunath Cascades, Macleodganj, Dharmsala, in mossy fissures in rock face near cascade, VI.1981, G. M. de Rougemont (4 ♂ & 4 ♀); HP, Vashisht, Beas Valley, in wet moss in mossy fissures of rock face of stream, VI.1981, G. M. de Rougemont (2 ♂ and 4 ♀).

D. nigrovirens was descrobed from S. Burma and also recorded from Nepal and the UP. Puthz regarded the extant material as probably representing a polytypic species, including therein all forms of group 1 having a recurved tooth on the ventral face of the apical mucron of the median lobe. Two new species, lying well outside the possible range of variability of *D. nigrovirens* have been described in this paper, so it is possible that a reappraisal of *D. nigrovirens* would justify the designation of a new species to include the specimens listed above and the old material from the UP in the BMNH, with which they agree in every respect. A figure (7) is given of the aedeagus of this form which may be compared with that given for the nominate form by Puthz (1969).

Dianous reformator Rougemont

Dianous reformator Rougemont, 1980, Ent. Basil 5: 178, figs.
Dianous reformator Puthz, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 132.

Material studied: Nepal: Prov. Bagmati, Burlang Bhanjyang, 2600 m, 5.IV.1981, I. Löbl & A. Smetana (1 ♀).

This species was only known by the type series from Nepal.

Dianous wittmeri n. sp.

This last member of group 1 is sufficiently distinct to be described, albeit on a single female example.

Length ca. 4.3 mm. Black, the fore-body with a dark leaden-blue tinge; all appendages except the dark brown coxae dark testaceous, the knees slightly darker. A robustly built species, the body surfaces devoid of microsculpture.

Head narrower than elytra (74: 84), the eyes less prominent than in related species; average distance between eyes: 44; frons with a median depression which is very narrow posteriorly, broadening to post-antennal tubercles in front, the surfaces on either side strongly convex, rising well above the level of eyes in frontal view; the puncturation is coarse, sub-rugose, the diameter of punctures on vertex equal to that of second antennal segment; the median furrow is narrowly impunctate posteriorly, while anteriorly as far as the clypeus the punctures are larger than average. Antennae moderate, just reaching the base of pronotum.

Pronotum scarcely longer than it's greatest breadth (60: 59), the latter situated at equal distance from anterior border and base, the sides strongly sinuate posteriorly and rather suddenly constricted anteriorly; the surface is rather uneven, with irrregular impressions on sides and near base, the puncturation a little coarser than that of head, the interstices not confluent except for the space of a few punctures near the base.

Elytra transverse (78: 84), convex, their greatest breadth behind the middle, the sides evenly rounded; the surface is fairly even with the exception of an anterior juxta-sutural impression, the puncturation coarser than that of pronotum, and confluent in apical half.

Abdomen sub-cylindrical, moderately tapered; breadth of segment III: 62; breadth of segment VII: 46 (measured from outer edges of paratergites). Abdominal borders moderate: paratergites IV: 5, or equal to the length of antennal segment VII, finely and densely punctured. The puncturation of tergites III–VII is very fine, not close, the interstices broader than the diameter of punctures; on tergite VIII the punctures are much larger than the diameter of eye-facets. The entire abdomen except tergite X is clothed with fine recumbant golden pubescence. Sternite IX (valvifers) with prominent, rounded apico-lateral angles bearing 3–4 denticles.

Legs moderately long; length of metatibia: 70; metatarsi: 53; metatarsal segments: I: 19; II: 6; III: 5; IV: 5; V: 20; fourth segments simple.

Male: unknown.

Holotype ♀ (NHM-Basel): India, Darjeeling District, Chim Khona (Ghum), 2200 m, 28.V.1975, W. Wittmer.

In PUTHZ' key this new species should fit after *D. nigrovirens* (Fv.), despite it's transverse (but not trapezoidal) elytra. It does not closely resemble that species, being smaller and of a broader build, with more convex lateral portions of frons, and further differs by the sparser and finer abdominal puncturation, shorter tarsi, shape of the ninth sternite, and colour. In size and general appearance it is closer to *D. reformator* Rougemont, but differs in it's colour and coarser puncturation, more convex lateral parts of head, transverse elytra, broader abdominal borders, shorter tarsi and by the shape of the ninth sternite.

Dianous championi Cam.

Dianous championi CAMERON, 1920, Ent. Mon. Mag. 57: 183.
Dianous sikkimi CAMERON, 1943, Proc. R. Ent. Soc. London (B) 12: 4.
Dianous championi ROUGEMONT, 1980, Ent. Basil 5: 174.
Dianous championi PUTHZ, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 117, fig.

Material studied: Nepal: Bagmati Prov., Sundarijal Cascades, 26.X.1979, G. M. de Rougemont (4 ♂ and 9 ♀); Bagmati Prov., Nagarkot, 12.III.1981, G. M. de Rougemont (4 ♂); Chipling, 2300 m, 5.IV.1981, I. Löbl & A. Smetana (9 ex.); Bagmati Prov., above Sundarijal, 4.IV.1981, I. Löbl & A. Smetana (1 ex.).

Already recorded from Nepal, and known besides from Sikkim.

Dianous gracilipes Champ.

Dianous gracilipes CHAMPION, 1921, Ent. Mon. Mag. 57: 183.
Dianous gracilipes PUTHZ, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 111, fig.

Material studied: Nepal: Bagmati Prov., Dakshinkali, running on a boulder at the waterline by cascade, 26.VIII.1980, G. M. de Rougemont (1 ♀).

New to Nepal, but known from the UP and from Assam.

Dianous miripes n. sp. Figs 5, 12.

This new species is so closely allied to *D. latitarsis* Bck. and *D. gracilipes* Cham. (group 2, PUTHZ, 1981) that a detailed description is unnecessary.

Body black, the head with a blue reflex, the pronotum and abdomen with a faint greenish or bronze reflex; elytral reflex blue in humeral area, bronze in posterior ⅔rds.

Proportions of Holotype: Length: ca. 10mm. Breadth of head: 132; antennal segments: I: 20; II: 11; III: 117; IV: 40; V: 42; VI: 40; VII: 38; VIII: 32; IX: 23; X: 23; XI: 20; length of pronotum: 94; breadth of

pronotum: 92; greatest length of elytra: 180; length of suture: 154; breadth of elytra: 148; length of protarsi: 80; protarsal segments: I: 30; II: 10; III: 9; IV+V: 30; length of metatibia: 195; length of metatarsi: 95; metatarsal segments: I: 47; II: 11; III: 9.5; IV+V: 30.

Male: Sternite VIII with a very shallow, broad apical emargination; sternite IX almost truncate, the apico-lateral angles acute but not produced or toothed; aedeagus: figure 5.

Female: Sternite VIII slightly produced, the posterior margin broadly rounded; valvifers comensurate with the male ninth sternite, their apicomedian angles broadly rounded.

Holotype ♂ (NHM-Basel) and 7 paratypes (3 ♂ and 4 ♀, coll. Rougemont and Puthz): India: HP, Nagar, 1700 m, running on boulders in a small stream, VI.1981, G. M. de Rougemont. 1 paratype ♀ (coll. Puthz): Kashmir, Palmar, 1700–1800 m, 1.III.1980, H. Rausch & H. Aspöck.

S. miripes n. sp. is almost identical in size, facies, colour and puncturation with *D. latitarsis* and *D. gracilipes*, and should fit between these two in Puthz' key. The pronotal puncturation of all three species is extremely fine and sparse, the shiny surface in sharp contrast to the rugose prosternum, but the punctures are a little coarser near the base. The new species may or may not bear a few coarser punctures near the anterior border of the pronotum (this is used as a diagnostic character between the other two species in Puthz' key). The antennae, although very long and slender, are slightly shorter than those of the other species, reaching to about 4/5ths the length of elytra. The protarsi of the new species have the same proportions as those of *D. latitarsis*, the first segment being at least one and a half times as long as the following three together (1.3–1.4 times in *D. gracilipes*). The most salient character of *S. miripes* n. sp. is the developement of the membranous soles of the tarsal segments[2]. While segments II and III bear soles of the normal type, those of segment IV are so enlarged that they form a tube eclosing the whole of segments IV and V excepting the apex and tarsal claws of all tarsi (Fig. 12). The structure is not always clear, as the 'tube' is often torn into several strips.

The aedeagus of *D. miripes* n. sp. confirms it's status as a distinct species: the outline of the median lobe is somewhat intermediate between those of *D. latitarsis* and *D. gracilipes*, but the apical mucron is longer than in either those species (cf. Figs 19 and 20, Puthz, 1981). The inner sac does not show any clear sclerotised structures.

Dianous lobigerus Champ.

Dianous lobigerus Champion, 1919, Ent. Mon. Mag. 55: 48.
Dianous lobigerus Puthz, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 113, Fig.

Material studied: India: HP, Katrain, Beas Valley, at the water-line on boulder in stream, VI.1981, Rougemont (1 ♂).

New to Himachal Pradesh, but widely distributed in the central Himalayan foothills from the UP to Assam.

Dianous versicolor Cam.

Dianous versicolor Cameron, 1914, Trans. Ent. Soc. London 1913: 533.
Dianous versicolor Puthz, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 115, Fig.

Material studied: Bhutan: Bhunakha, X.1980, G. M. de Rougemont (1♂); Lemjelum Waterfall, near Thinley Gang, X.1980, G. M. de Rougemont (1 ♂); Chasilakha, X.1980, G. M. de Rougemont; (1 ♂). Nepal: Bagmati Prov., Sundarijal Cascades, on rock faces bearing lichens, in heavy spray from waterfalls, 24.VIII & X.1980, G. M. de Rougemont (17 ex.).

This species was previously only known from the UP; these new records from Nepal and Bhutan therefore extend considerably it's range to the East. The single ex. from Thinley Gang in Bhutan differs notably from all other exx. by it's smaller size and proportionately more slender build, darker colour without a metallic reflex on the head or pronotum, the male eighth sternite which is less deeply emarginate, and the aedeagal parameres which are slightly more spatulate and bent inwardly. Externally the insect appears to belong to a different taxon; the occurence of the typical form in Bhutan shows that this small form is not an eastern vicariant, so it must be assumed that it is an individual aberration of an otherwise variable species, for the outline of the medi-

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[2] This structure, which is common to several of the larger *Dianous* species such as *D. versicolor*, *D. anandalei*, *D. chetri* etc. has not hitherto been described, and was brought to my attention by Dr. Puthz in reference to the paratype of *D. miripes* from Kashmir. Typically the structure consists of a fairly rigid but fine, yellowish, elongate membranous appendage attached to the base of the segment, so that the three overlapping membranes form a continuous sole from the base of segment II to the onychium, the membrane on segment IV being much longer than those of segments II and III. These soles are more or less developed in different species; in *D. gracilipes*, they are similar to those of the new species, but the membrane of segment IV only extends to cover that segment, leaving most of segment V free. The structure has probably been overlooked in the past because it is almost invisible on mounted specimens when the tarsi are attached to or rest on the mount, and when free, resemble a film of dried glue of other substance adhering to the long fine setae born on the tarsal segments. It may be assumed that the structure is functional, increasing the tarsus' resistance to the surface tension of water, and possibly also increasing the animal's bouyancy by trapping air between the sole, the setae and the tarsus.

an lobe, and the asymmetrical lobe of the fourth tarsal segment are identical with the type form.

Dianous gregarius n. sp. Fig. 6.

This new species is indistinguishable superficially from *D. versicolor* Cam., and owing to the similar build of the metatarsi, runs to that species in Puthz' key.

Black, the fore-body, and sometimes legs, with a dark greenish and occasionally purple reflex. Head and elytra very finely and densely punctured, the pronotum shiny, with only a few fine shallow punctures.

Proportions of Holotype: Length: ca. 8 mm. Breadth of head: 106; length of antennae: 213; length of pronotum: 86; breadth of pronotum: 80; maximum length of elytra: 152; breadth of elytra: 126; metatibia: 142; metatarsal segments: I: 36; II: 7; III: 7; IV (including lobes): 14; V: 22.

Fourth pro- and mesotarsal segments distinctly but narrowly bilobed; fourth metatarsal segments shaped as in *D. versicolor*, but slightly shorter, asymmetrical, produced into a single lobe towards the external side of segment; segments III–IV with membranous soles, that of segment IV extending in a point to the apex of onychium.

Male: Sternites VII slightly emarginate and impressed in apico-median area, which is covered in long dense pubescence; sternite VIII with a small shallow emargination; the aedeagus is of the same type as that of *D. versicolor*, the internal structures simple (Fig. 6), but the apex of the median lobe is much broader, and furnished with numerous long black setae, whereas that of *D. versicolor* is glabrous.

Female: Sternite VII slightly emarginate; sternite VIII simple.

Types: Holotype ♂ (NHM-Basel) and 25 paratypes (16 ♂ and 9 ♀, NHM-Basel and coll. Rougemont): Nepal, Bagmati Prov. Sundarijal Cascades, on rock faces under heavy spray, 24.VIII.1980, G. M. de Rougemont). 1 paratype ♂ (coll. Rougemont): Nepal, Kathmandu to Kakani road, 26.VIII.1980, G. M. de Rougemont.

Males ot this new species are easily determined by examination of the aedeagus, even when only the apex protrudes from the genital segment, but single females can only be distinguished with difficulty from the variable *D. versicolor* by the length of the fourth metatarsal lobe.

Dianous frater Cam.

Dianous frater Cameron, 1927, Ent. Mon. Mag. 63: 10.
Dianous frater Puthz, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 115.

Material studied: Bhutan: Lenjelum Waterfall, near Thinley Gang, on mossy boulders in spray zone of waterfall, X.1980, G. M. de Rougemont (2 ♂ and 2 ♀).

New to Bhutan, but known from the two neighbouring states of Sikkim and Assam.

Dianous radiatus Champ.

Dianous radiatus Champion, 1919, Ent. Mon. Mag. 55: 51.
Dianous radiatus Puthz, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 117.

Material studied: India: HP, Simla, on mossy boulders in a small stream in forest, VI.1981, G. M. de Rougemont (15 ex.).

This species was already recorded from Himachal Pradesh as well as from the UP and Assam. In a private communication Puthz provided me with the following new record: several exx. from Pakistan: Swat, Marghuzar, 1300–2000 m, 8–10.VII.1981, W. Heinz. These finds extend the species' range to the West into an area which is much poorer in number of species.

Dianous aereus Champ.

Dianous aereus Champion, 1919, Ent. Mon. Mag. 55: 53.
Dianous aereus Puthz, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 118.

Material studied: Bhutan: Bhunakha, 2500 m, in wet moss in spray zone of waterfall, X.1980, G. M. de Rougemont (24 ♂ and 19 ♀); Thimpu, 2500 m, in moss at the water-line on boulders in a torrent, X.1980, G. M. de Rougemont (12 ♂ and 12 ♀); Lemjelum Waterfall, near Thinley Gang, in wet moss in spray zone of waterfall, X.1980, G. M. de Rougemont (1 ♂ and 6 ♀); 8 km NE of Dochu La, ca. 2800 m, in wet moss in torrent, X.1980, G. M. de Rougemont (1 ♂ and 1 ♀). India: HP, Katrain and Manali, Upper Beas Valley, on mossy boulders in tributary streams of R. Beas, VI.1981, G. M. de Rougemont (9 ♂ and 11♀).

New to Bhutan, but widely distributed in the Himalaya eastward to Sikkim, and recently taken in large numbers by me in Burma.

Dianous anandalei Bnh.

Dianous anandalei Bernhauer, 1911, Ent. Bl. Biol. Syst. Käfer 7: 57.
Dianous anandalei Puthz, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 119.

Material studied: Nepal: Bagmati Prov., road between Kathmandu and Kakani, in spray zone of small cascade, 26.VIII.1980, G. M. de Rougemont (2 ♂ and 1 ♀); Bagmati Prov., Naubise, X.1980, Rougemont; 1 ♂: Nepal, Bagmati Prov., Sundarijal Cascades, X.1980, G. M. de Rougemont (4 ♂ and 2 ♀).

New to Nepal. The species was described from the UP and West Bengal.

Dianous chetri Rougemont

Dianous chetri Rougemont, 1980, Ent. Basil 5: 172, Figs.
Dianous chetri Puthz, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 132.

Material studied: Bhutan: Lemjelum Waterfall, Near Thinley Gang, in spray zone of cascade, X.1980, G. M. de Rougemont (2 ♂ and 2 ♀). Nepal: Bagmati Prov., Sundarijal Cascades, X.1980, G. M. de Rougemont (2 ♂ and 3 ♀).

New to Bhutan. This species was described from Nepal, from exx. taken by the author. The long series of *D. anandalei* Bnh. in the BMNH, including the Type material of that species, was found to contain a large proportion of exx. of *D. chetri* Rougemont.

Dianous inaequalis Champ.

Dianous inaequalis Champion, 1919, Ent. Mon. Mag. 55: 45.
Dianous inaequalis Puthz, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 122, Fig.

Material studied: Nepal: Bagmati Prov., Sundarijal Cascades, X.1980, G. M. de Rougemont (1 ♂ and 2 ♀). India: HP, Beas Valley, Manali and Vashisht, VI.1981, G. M. de Rougemont (1 ♂ and 1 ♀); Bagsunath Cascades, Macleodganj, Dharmsala, VI.1981, G.M. de Rougemont (1 ♂).

New to Himachal Pradesh, the most westerly point in it's distribution: UP, Nepal, Sikkim, China and Thailand.

Dianous robustus Cam.

Dianous robustus Cameron, 1924, Trans. Ent. Soc. London: 179.
Dianous robustus Puthz, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 120.

Material studied: India: HP, Bagsunath Cascades, Macleodganj, Dharmsala, 1900 m, VI.1981, G. M. de Rougemont (2 ♂ and 5 ♀).

This, the largest known stenine, is also the most hygrophylous of all the species observed by me. The series was found clinging to and moving over a vertical rock face down which ran a steady film of water, some of the insects "up to their knees" in the water, while 2 exx. were seen totally submerged. Cameron (1930) states that the type specimens (from the UP) were found just above the water line, and that the insects were very active. These new subjects were on the contrary rather sluggish and easily picked off the rock face by hand, their bodies too large to enter the aspirator. The species is only known by these two series.

Dianous cyanogaster Champ.

Dianous cyanogaster Champion, 1919, Ent. Mon. Mag. 55: 47.
Dianous cyanogaster Puthz, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 121.

Material studied: Nepal: Bagmati Prov., Sundarijal, X.1980, G. M. de Rougemont (2 ♂ and 1 ♀).

New to Nepal; previously known from the UP and Assam.

Dianous margaretae n. sp.

This new species is close to *D. consors* Cam., but the relative breadth of head and elytra make it run to *D. kabakovi* Puthz in that author's key.

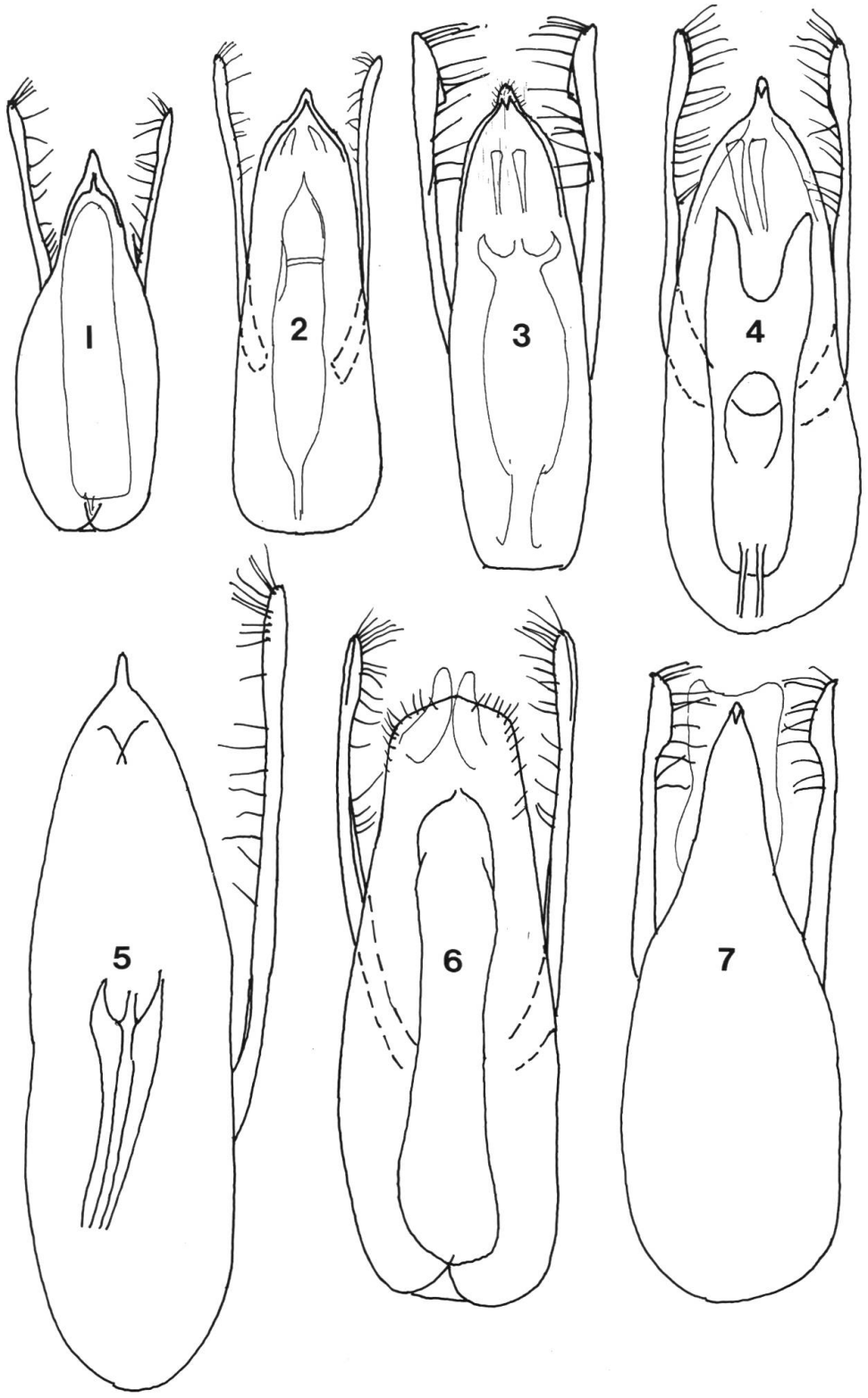
Length: ca. 8.8 mm. Black, the fore-body with a metallic olive-green reflex; each elytron with a bottle-green marking on centre of disc, extending in antero-lateral portions to cover the lateral declivety of elytron to humeral angle; labrum, palpi, antennae and legs black, the antennal club lighter.

Head narrrower than elytra (122: 132), the vertex broad (average distance between eyes: 80), the temples strongly constricted to neck, as long as the diameter of eyes (seen from above): 40; frons with two furrows extending from the level of post-antennal tubercles to base, the furrows more deeply depressed at the level of a line drawn between the centre of eyes; the head and neck are covered in a uniform, close puncturation, the punctures smaller than eye-facets; pubescence short and dense on vertex, becoming progressively longer anteriorly. Antennae very long (320), extending to the posterior margin of elytra when reflexed; antennal segments: I: 18; II: 12; III: 61; IV: 31; V: 32; VI: 32; VII: 31; VIII: 24; IX: 18; X: 17; XI: 17.

Pronotum elongate (95: 85), broadest at middle, the sides sinuate posteriorly but not much constricted; all margins with a narrow, rounded shiny border; the surface is irregular, with numerous impressions, the puncturation somewhat irregular; punctures are deep, simple, their diameter greater than that of eye-facets, and the interstices very strongly microscultured in isodiametric meshes.

Elytra elongate (146: 132), subparallel, the shoulders broad (distance between humeral angles: 104), the posterior margins bi-sinuate; the surface of elytra is uneven; on each elytron a blunt raised line runs for a little more than ⅔rds the length of elytron, ending in a callosity which forms the external delimitation of a shallow impression bearing a weak fascia of whitish pubescence; the puncturation is deep, fine and dense, somewhat finer but relatively a little sparser than that of head, denser in the discal impressions bearing the fascia and bottle-green marks.

Abdomen with moderate borders (breadth of paratergite IV: 10); tergites III to VIII very finely and densely punctate and pubescent, the puncturation coarser in transverse basal depressions of tergites, and denser, almost rugose, on paratergites. Tergites IX and X with much



Figs 1–7: Aedeagi in ventral view of: 1, *Dianous bhutanensis* n. sp. 2, *D. inconspicuus* n. sp. 3, *D. viridicupreus* n. sp. 4, *D. nepalensis* n. sp. 5, *D. miripes* n. sp. 6, *D. gragarius* n. sp. 7, *D. nigrovirens* Fv. from Dharmsala.

coarser and sparser punctures on a strongly micro-reticulate background; tergite VIII with a shallow apical emargination.

Legs long; protarsal segments: I: 19; II: 9; III: 7; IV+V: 35; length of metatibia: 172; length of metatarsi: 122; metatarsal segments I: 55; II: 17; III: 10; IV+V: 30; all fourth tarsal segments simple, not dilated; segments II–IV bearing membranous soles on all tarsi, those of teh metatarsi not quite reaching apex of segment V.

Male: Unknown.

Female: Sternites VII and VIII unmodified, their posterior margins straight; valvifers (ninth sternite) with blunt apico-lateral angles, not toothed.

Holotype ♀ (coll. Rougemont): Nepal, Bagmati Prov., stream descending from Nagarkot, in moss at the waterline, X.1980, G. M. de Rougemont.

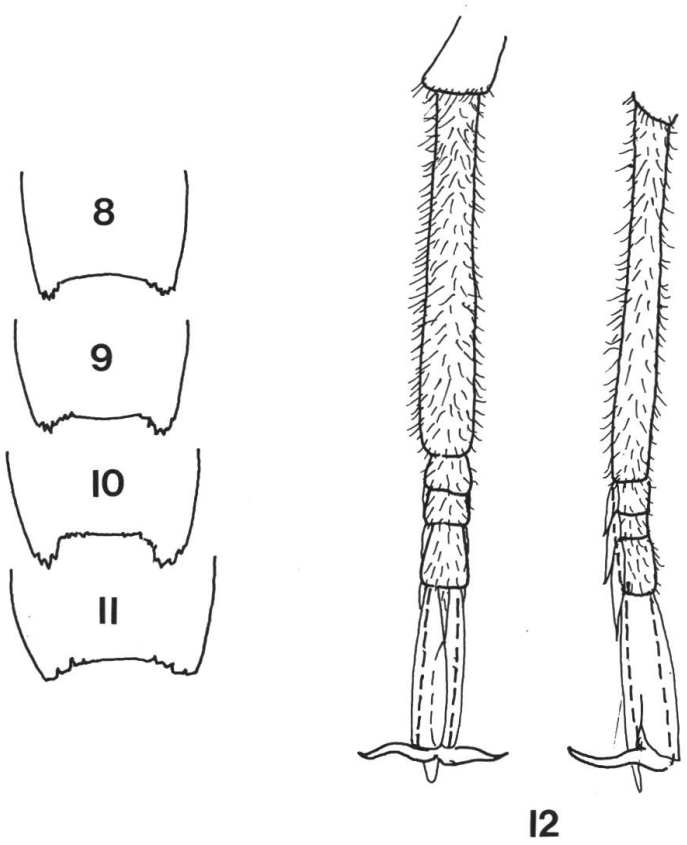
This new species should be inserted in PUTHZ' key after *D. kabakovi* Puthz, a species known by a single female from Vietnam. I have not seen that species, but Dr Puthz, to whom I sent *D. margaretae* for confirmation of it's originality, assures me that the two are distinct, and that the new species more closely resembles *D. consors* Cam. It differs from *D. kabakovi* Puthz most conspicuously by it's colour, the other species being blue with a purple reflex on the elytra, and also by it's proportionately (in relation to elytra) narrower head and by the unmodified sternites of the female. From *D. consors* Cam. it differs by it's generally more robust build, proportionately shorter and stouter legs, narrower head with more prominent median portion, much stronger pronotal microsculture, and by the conformation of the female eighth sternit.

Dianous caeruleonotatus Cham.

Dianous caeruleonotatus (sic) CHAMPION, 1919, Ent. Mon. Mag. 55: 45.
Dianous caeruleonotatus PUTHZ, 1981, Ent. Abh. Mus. Tierk. Dresden 44 (6): 121.

Material studied: India: HP, Beas Valley, Katrain, VI.1981, G. M. de Rougemont (2 ♂).

This species appears to have a purely western Himalayan distribution, from Afghanistan to the UP; it had not previously been recorded from Himachal Pradesh.



Figs 8–12: Outline of male ninth sternite of: 8, *Dianous bhutanensis* n. sp. 9, *D. inconspicuus* n. sp. 10, *D. viridicupreus* n. sp. 11, *D. nepalensis* n. sp. 12, Metatarsus in dorsal and lateral views of *Dianous miripes* n. sp.

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Dr V. Puthz provided a few of the insects collected by the Natural History Museum Basel which are studied in this paper, and in private correspondance gave me much valuable advice. I also wish to thank Dr A. Smetana (Agriculture Canada, Ottawa) for the opportunity of studying the *Dianous* he collected in Nepal.

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