

ODONATA FROM THE DEHRA DUN VALLEY (UTTAR PRADESH, INDIA) WITH NOTES ON SYNONYMY OF SOME WEST HIMALAYAN SPECIES

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32 spp. are recorded from 5 localities near Dehra Dun. *Calicnemia miniata doonensis* Sangal & Tyagi, 1984 is raised to specific rank, *C. carminea pyrrhosoma* Lieftinck, 1984 is considered a junior synonym of *C. doonensis* and *C. c. carminea* Lieftinck, 1984 is downgraded to subspecies of *C. doonensis*. — The following synonymies are established: *Prodasineura a. autumnalis* (Fraser, 1922) (for *Caconeura a. gaudawricus* Sahni, 1964); — *Ischnura a. aurora* Brauer, 1865 (for *I. bhimtalensis* Sahni, 1965); — *Ischnura forcipata* Morton, 1907 (for *Agriocnemis nainitalensis* Sahni, 1964); — *Coeliccia renifera* (Selys, 1886) (for *Calicnemia maheshi* Sahni, 1964, and for *Coeliccia kumaonensis* Singh & Baijal, 1954); — *Copera marginipes* (Rambur, 1842) (for *Disparoneura bhatnagri* Sahni, 1965); — *Indolestes cyaneus* (Selys, 1862) (for *Archibasis sushmae* Baijal, 1955); — *Anisopleura lestoides* Selys, 1853 (for *A. kusumi* Sahni, 1965); — *Omychogomphus bistrigatus* (Hagen in Selys, 1854) (for *O. garhwalicus* Singh & Baijal, 1954); *Orthetrum taeniolatum* (Schneider, 1845) (for *O. garhwalicum* Singh & Baijal, 1954); — *Tholymis tillarga* (Fabricius, 1798) (for *T. paratillarga* Singh & Prasad, 1980). — The status of some other Indian taxa is also discussed.

INTRODUCTION

While participating in the Second Indian Symposium of Odonatology in Dehra Dun, 8-10 October 1986, I had a chance to collect dragonflies at a few sites in the Dehra Dun Valley, Uttar Pradesh.

Dehra Dun Valley (Doon Valley) covers an area of ca 1200 sq km, and it is bounded by the Himalaya in the North, the Siwalik Hills in the South, the Ganges in the East and the Yamuna River in the West. According to TYAGI et al. (1986) over 90 Odonata species are reported from the valley. However, only ca 80

species are listed in their catalogue. The rest, including all *Orthetrum* species, are missing, likely so due to an error in printing. Odonatologically, the Dehra Dun Valley seems to be the best known part of the whole Western Himalaya area from where KUMAR & PRASAD (1981) list 162 species and subspecies. However, over 20 of these have a dubious taxonomic status. Some of them have already been synonymized. In the present paper several other synonymies are established and suggestions for further study are presented.

SITES VISITED

- Loc. 1: Sulphur Springs (or Sahastradhara), NE from Dehra Dun; 9.X. and 11.X.1986. A stream in a glen, fed by small torrential streams and springs from adjacent mountain slopes. The first visit was a part of the mid-symposium collecting trip, guided by Dr B.K. Tyagi.
- Loc. 2: River Rispana at Tapovan, Rajpur, N from Dehra Dun; 12.X.1986. A stream descending from a mountain.
- Loc. 3: A tiny seasonal pond in the village of Tapovan, Rajpur; 12.X.1986.
- Loc. 4: Kulhal barrage on River Ashan, W from Dehra Dun; 13.X.1986. Edge of the dam, with a rich vegetation and nearby wetlands with some running water.
- Loc. 5: Dakpathar barrage, W from Dehra Dun; 13.X.1986. Concreted edge of the dam.

The visits to localities 2-5 formed an unofficial post-symposium tour, arranged for Prof. Janny M. van Brink and the author. Mrs Madhu Malti Dwivedi guided us on 12 October, and Dr S.K. Sangal and Mrs Dwivedi together on 13 October. I am grateful to all colleagues listed above for the company in the field. Mrs Dwivedi also collected some of the specimens.

SPECIES COLLECTED

- Calicnemia d. doonensis* Sangal & Tyagi, 1984 — Loc. 1: 16 ♂, 1 ♀.
- C. eximia* (Selys, 1863) — Loc. 1: 4 ♂; — Loc. 2: 4 ♂, 1 ♀.
- Agriocnemis pygmaea* (Rambur, 1842) — Loc. 4: 2 ♂.
- Enallagma parvum* Selys, 1876 — Loc. 4: 1 ♂.
- Ischnura a. aurora* Brauer, 1865 — Loc. 3: 6 ♂, 2 ♀; — Loc. 4: 1 ♀; — Loc. 5: 3 ♂.
- I. forcipata* Morton, 1907 — Loc. 1: 2 ♀; — Loc. 2: 1 ♂.
- Ceriagrion coromandelianum* (Fabricius, 1798) — Loc. 1: 1 ♀; — Loc. 4: 9 ♂, 3 ♀.
- Pseudagrion decorum* (Rambur, 1842) — Loc. 4: 1 ♂.
- P. r. rubriceps* Selys, 1876 — Loc. 4: 4 ♂, 1 ♀.
- P. spencei* Fraser, 1922 — Loc. 4: 1 ♂.
- Megalestes major* Selys, 1862 — Loc. 1: 2 ♂.
- Anisopleura lestoides* Selys, 1853 — Loc. 1: 21 ♂; — Loc. 2: 8 ♂, 3 ♀.
- Anisogomphus occipitalis* (Selys, 1854) — Loc. 2: 2 ♂.
- Onychogomphus bistrigatus* (Hagen in Selys, 1854) [= *O. m.-flavum* Selys, 1894] — Loc. 2: 5 ♂.
- O. schmidtii* Fraser, 1937 [= *bistrigatus* sensu FRASER, 1934] — Loc. 2: 7 ♂.

These two *Onychogomphus* species were flying sympatrically on the stream. It may be possible to separate them in the field, since in *bistrigatus* the abdomen is slightly longer and its apical segments

distinctly more expanded.

The measurements of the present material are as follows: *O. bistrigatus*: abdomen (incl. appendages) 37-39 mm, hind wing 29-31 mm. *O. schmidtii*: abdomen 34-36 mm, hind wing 28-30 mm.

FRASER (1937) clarified the complex taxonomic confusion regarding these two species. The present males of *bistrigatus* resemble more FRASER's (1934, pp. 250-254) form "b" of *m-flavum* than form "a".

Gynacanthaeschna sikkima (Karsch, 1891) — Loc. 1: 1 ♀. — Several other specimens were seen flying high over a small torrential mountain stream.

Macromia moorei Selys, 1874 — Loc. 2: 1 ♂.

Orthetrum glaucum (Brauer, 1865) — Loc. 1: 6 ♂; — Loc. 2: 7 ♂, 1 ♀.

O. luzonicum (Brauer, 1868) — Loc. 4: 7 ♂.

O. pruinatum neglectum (Rambur, 1842) — Loc. 1: ♂♂ seen; — Loc. 4: 1 ♂.

O. s. sabina (Drury, 1770) — Loc. 4: 1 ♂.

O. taeniolatum (Schneider, 1845) — Loc. 2: 2 ♂, 2 ♀; — Loc. 5: 2 ♂, 1 ♀.

O. t. triangulare (Selys, 1878) — Loc. 1: 5 ♂, 2 ♀; — Loc. 2: 5 ♂.

Acisoma p. panorpoidea Rambur, 1842 — Loc. 4: 4 ♂.

Crocotemis e. erythraea (Brulle, 1832) — Loc. 2: 1 ♂; — Loc. 4: 7 ♂, 1 ♀.

Neurothemis fulvia (Drury, 1773) — Loc. 1: ♂♂ seen.

N. t. tullia (Drury, 1773) — Loc. 4: 2 ♂.

Sympetrum commixtum (Selys, 1887) — Loc. 2: 1 ♂.

Trithemis aurora (Burmeister, 1839) — Loc. 1: 1 ♂, 1 ♀; — Loc. 2: 1 ♂; — Loc. 4: 1 ♂.

T. festiva (Rambur, 1842) — Loc. 1: 2 ♂; — Loc. 2: 1 ♂.

T. pallidinervis (Kirby, 1889) — Loc. 4: 6 ♂.

Palpopleura s. sexmaculata (Fabricius, 1787) — Loc. 4: 3 ♂.

TAXONOMIC NOTES ON *CALICNEMIA*

The reddish *Calicnemia* species, reported from Sulphur Springs in Dehra Dun by TYAGI (1982), was described by SANGAL & TYAGI (1984, 1985) as *C. miniata doonensis*. This name appeared first in the Abstracts booklet of the First Indian Symposium of Odonatology, which was printed and distributed in January 1984 (SANGAL & TYAGI, 1984). The proper, thorough description appeared a year later, in the Proceedings of the Symposium (SANGAL & TYAGI, 1985). However, *C. doonensis* is incorrectly associated with *C. miniata* (Selys, 1886). These taxa are not even closely related. *C. miniata* belongs to a species group in which the recurved penis lobe is broad and expanded, whereas in *doonensis* the penis lobe ends in ribbon-like branches. *C. doonensis* is a distinct good species. It is the same taxon as *Calicnemia carminea pyrrhosoma* Lieftinck, 1984, the holotype of which also comes from Sulphur Springs. Thus it is necessary to decide which name has priority. LIEFTINCK's description was issued in September 1984, later than the abstract of *C. doonensis*'

description, but before the proper description. In the abstract by SANGAL & TYAGI (1984), the name of the new taxon is stated, the holotype is designated, and the following presentation is given: "*C. miniata doonensis* is the only subspecies now known for the species. The subspecies clearly differs from the species in the following characters: the shape of the pterostigma, shape and the arrangements of the spear-shaped spines in the prothoracic legs, the relatively shorter hind wings and the colour of the eyes".

Although totally inadequate for identification, the above sentences must be considered as a valid description, since the hind wing of the new taxon is stated to be shorter than in *C. miniata*! Thus the abstract can be accepted as the primary description of the species and, consequently, the name *doonensis* has priority over Lieftinck's name. LIEFTINCK's (1984) nominate subspecies *C. carminea carminea* from Nepal will consequently fall to a subspecies of *doonensis*. LIEFTINCK (1984) comments on SANGAL & TYAGI's (1984) abstract on *C. miniata doonensis* and considers the name as nomen nudum for a race (?) of *C. miniata*.

The above considerations can be summarized as follows:

Calicnemia doonensis doonensis Sangal & Tyagi, 1984, stat. nov.

Calicnemia carminea pyrrhosoma Lieftinck, 1984, syn. nov.

Known distribution: NW India: Dehra Dun valley.

Calicnemia doonensis carminea Lieftinck, 1984, comb. nov.

Known distribution: Nepal.

As discussed already by LIEFTINCK (1984), *C. eximia* occurs sympatrically with *C. d. doonensis* in mixed populations at Sulphur Springs. Males of these two species can easily be held apart in the field; in *eximia* the abdomen is stouter and distinctly more scarlet than in *doonensis*. *Calicnemia* spec. indet. (not *miles*), listed from Dehra Dun valley by TYAGI et al. (1986), is undoubtedly *C. eximia*.

SYNONYMIC NOTES ON SOME WEST HIMALAYAN SPECIES

Several dragonfly taxa were described as new from the Western Himalaya in the 1950-1960s. A glimpse at KUMAR & PRASAD's (1981) survey indicates that most of these "new species" have never been recorded after the original descriptions. Some of them have already been synonymized. RAM & SRIVASTAVA (1984) established the synonymy of *Orthetrum mathewi* Singh & Baijal, 1955 with *Pantala flavescens* (Fabricius, 1798). *P. flavescens* was also described as *Sympetrum tandicola* by SINGH (1955) (see MITRA, 1973). *Lestes manaliensis* Singh, 1955 was placed in synonymy with *Indolestes cyaneus* (Selys, 1862) and *Orthetrum gangi* Sahni, 1965 and *O. fraseri* Sahni, 1965 were both synonymized with *O. glaucum* (Brauer, 1865) by DAVIES & TOBIN (1984, 1985).

Due to the difficulty in obtaining the type material for study, it was necessary to rely on the descriptions alone in considering the status of the following species:

Prodasineura autumnalis (Fraser, 1922) (= *Caconeura autumalis* [sic!] *gaudawricus* Sahni, 1964, syn. nov.).

SAHNI (1964) compared his subspecies with descriptions of the nominate taxon and the Lower Burmese *P. nigra* (Fraser, 1922)! The description of his material agrees well with the nominate subspecies, described from Assam; the minor differences are due to individual and age variation only.

Ischnura a. aurora Brauer, 1865 (= *Ischnura bhimtalensis* Sahni, 1965, syn. nov.).

The description of *I. bhimtalensis* by SAHNI (1965a) agrees with *I. a. aurora*.

Ischnura forcipata Morton, 1907 (= *Agriocnemis nainitalensis* Sahni, 1965, syn. nov.).

Already MITRA (1975) expressed doubt as to the generic affiliation of *A. nainitalensis*. From the description by SAHNI (1965a) it is evident that it is conspecific with *I. forcipata*.

Indolestes cyaneus (Selys, 1862) (= *Archibasis sushmae* Baijal, 1955, syn. nov.).

The brief description of the "coenagrionid" *A. sushmae* by Baijal in SINGH et al. (1955) tallies quite well with this lestid species!

Coeliccia renifera (Selys, 1886) (= *Calicnemis maheshi* Sahni, 1964, syn. nov. =

Coeliccia kumaonensis Singh & Baijal, 1954, syn. nov.).

LIEFTINCK (1984) pointed out that *C. maheshi* is a *Coeliccia*, probably *C. renifera*, but did not yet establish the synonymy. The synonymy is evident from SAHNI's (1964) description and figures of the thoracic colouration and appendages. The figures of the thoracic pattern and details of venation of *C. kumaonensis* by SINGH & BAIJAL (1954) coincide also with *C. renifera*. Both synonymized species come from the Kumaon Hills, within the range of *renifera*.

Copera marginipes (Rambur, 1842) (= *Disparoneura bhatnagri* Sahni, 1965, syn. nov.).

SAHNI's (1965a) figure of the hind wing indicates that his *bhatnagri* is a platynemidid rather than a protonneurid. It is evident from the description that it is referable to *Copera marginipes*. In the description of "*bhatnagri*" the superior appendages were considered as tubercles of the 10th segment and inferior appendages as superiors. "Inferior appendages" are likely excrements!

Anisopleura lestoides Selys, 1853 (= *Anisopleura kusumi* Sahni, 1965, syn. nov.).

The description and figures by SAHNI (1965a) agree in essential points with *A. lestoides*, and these taxa are undoubtedly conspecific.

Onychogomphus bistrigatus (Hagen in Selys, 1854) (= *Onychogomphus garhwalicus* Singh & Baijal, 1954, syn. nov.).

As far as the colouration is concerned, *O. bistrigatus* seem to be quite variable.

The description of *O. garhwalicus*, known only by the holotype male from Chakrata ranges, North-West from Dehra Dun (SINGH & BAIJAL, 1954), fits in well with my specimens of *bistrigatus* (see above), and they are considered conspecific. The length of abdomen and hind wing of *garhwalicus* are given as 37 mm and 41 mm, resp. However, the latter may be a printing error for 31 mm.

Orthetrum taeniolatum (Schneider, 1845) (= *Orthetrum garhwalicum* Singh & Baijal, 1954, syn. nov.).

The description by SINGH & BAIJAL (1954) of the colouration of the holotype male of *O. garhwalicum* agrees well with that of a young male of *taeniolatum*, and the figure of male genitalia coincides with *taeniolatum*.

Tholymis tillarga (Fabricius, 1798) (= *Tholymis paratillarga* Singh & Prasad, 1980, syn. nov.).

The differences pointed out by SINGH & PRASAD (1980) to separate these taxa are of no specific value. The figures of genitalia of *T. paratillarga* do not differ from those of *T. tillarga*.

REMARKS ON OTHER SPECIES AND SUGGESTIONS FOR FURTHER STUDY

The Odonata list of Western Himalaya (KUMAR & PRASAD, 1981) contains many other taxa that require a critical study of the type specimens:

Coenagrion kashmirus described inadequately and in a very confusing way by CHOWDHARY & DAS (1975) is likely one of the *Ischnura* or *Agriocnemis* species occurring in Kashmir.

Anaciaeschna kashmirensis described by SINGH & BAIJAL (1954) on specimens from Srinagar, Kashmir is probably *Anaciaeschna jaspidea* (Burmeister, 1839) and *Orthetrum guptai* Baijal in Singh et al. (1955), known only by the holotype male from Manali, Himachal Pradesh may prove to be a young male of *O. cancellatum* (Linnaeus, 1758).

Nanophya [sic!] *katrainensis* Baijal in Singh et al. (1955) described without illustrations, on the basis of a single female, is definitely not a *Nanophya*, and it may prove to be *Brachythemis contaminata* (Fabricius, 1793). Study of the types will easily reveal the status of these three species.

Crocothemis indica Sahni, 1965 was described on the basis of male specimens from Bhim Tal and Nainital. SAHNI's (1965b) original figure of male genitalia of *C. indica* is very different from his later figure (SAHNI, 1972). SAHNI (1972) also lists *C. misrai* Baijal & Agarwal, 1956, another dubious Indian *Crocothemis*, from Nainital and Almora. *C. e. erythraea* and *C. s. servilia* are known to overlap in Northern India. Due to the poor descriptions, the status of *C. indica* and *C. misrai* can be confidently disclosed only after studying the types.

Due to lack of material for comparison, *Himalagrion pithoragarhicus* Sahni, 1964, *Onychargia indica* Sahni, 1964 and *Acrogomphus mohani* Sahni, 1965 cannot be considered here.

In addition to these, several other dragonfly species described from other parts of India and Pakistan require a critical taxonomic treatment, and a considerable number of new synonyms are evident. In this connection I like to mention only the two *Orthetrum* species described by MEHROTRA (1961) from Ranchi, Bihar. *Orthetrum ganeshii*, known by a single female, may prove conspecific with *O. glaucum*. *Orthetrum chandrabali*, described from a single male, is more interesting. The size of the specimen, the extent of dark markings at the base of fore and hind wings and some details of the venation fit with *O. melania* (Selys, 1883). *O. melania* has recently been treated as specifically distinct from *O. triangulare* by LIEFTINCK et al. (1984), who report them to occur sympatrically in Taiwan. Similar sympatric occurrence is known from certain parts of China (ASAHINA, 1973, 1978). According to LIEFTINCK et al. (1984) *O. triangulare* is a polytypic species, forming a number of geographical races which are yet to be recognized and characterized in greater detail. The Indian populations should be carefully studied to find out whether the variability of *O. t. triangulare* reported by FRASER (1936) is due to the interspecific variability in *O. triangulare* only, or whether *O. melania* also occurs there. The status of *O. chandrabali* can only be established in this context.

REFERENCES

- ASAHINA, S., 1973. Notes on Chinese Odonata. IV. D.C. Graham collection from Szechuan and T.H. Cheng collection from Fukien. *Kontyû* 41: 446-460.
- ASAHINA, S., 1978. Notes on Chinese Odonata. VII. Further studies on the Graham collection preserved in the U.S. National Museum of Natural History, Suborder Anisoptera. *Kontyû* 46: 234-252.
- CHOWDHARY, S.K. & S.M. DAS, 1975. Notes on life-history of *Coenagrion kashmirus* n. sp. (Odonata, Zygoptera, Coenagrionidae). *All Indian Congr. Zool.* 3: 60-61.
- DAVIES, D.A.L. & P. TOBIN, 1984. *The dragonflies of the world: A systematic list of the extant species of Odonata*, Vol. 1: Zygoptera, Anisozygoptera. S.I.O., Utrecht.
- DAVIES, D.A.L. & P. TOBIN, 1985. *The dragonflies of the world: A systematic list of the extant species of Odonata*, Vol. 2: Anisoptera. S.I.O., Utrecht.
- FRASER, F.C., 1934. *The fauna of British India, including Ceylon and Burma. Odonata*, Vol. 1, Taylor & Francis, London.
- FRASER, F.C., 1936. *The fauna of British India, including Ceylon and Burma. Odonata*, Vol. 3, Taylor & Francis, London.
- FRASER, F.C., 1937. A note on the confusion of *Onychogomphus bistrigatus* (Hagen) with a new species of *Onychogomphus* (Odonata). *Proc. R. ent. Soc. Lond.* (B) 6: 161-164.
- KUMAR, A. & M. PRASAD, 1981. Field ecology, zoogeography and taxonomy of the Odonata of Western Himalaya, India. *Occ. Pap. zool. Surv. India* 20: 1-118.
- LIEFTINCK, M.A., 1984. Further notes on the specific characters of *Calicnemia* Strand, with a key to the males and remarks on some larval forms (Zygoptera: Platynemididae). *Odonatologica* 13: 351-375.

- LIEFTINCK, M.A., J.C. LIEN & T.C. MAA, 1984. *Catalogue of Taiwanese dragonflies (Insecta: Odonata)*. Asian Ecological Society, Taichung.
- MEHROTRA, P.N., 1961. On two new species of Orthetrum (Odonata, Libellulidae, Libellulinae). *Indian J. ent.* 21 [1959]: 137-139. 1 pl. excl.
- MITRA, T.R., 1973. *Sympetrum tandicola* Singh, 1955, a synonym of *Pantala flavescens* (Fabr.) (Odonata, Libellulidae). *Ent. Rec. J. Var.* 85: 30-31.
- MITRA, T.R., 1975. A review of Indian species of *Agriocnemis* Selys (Insecta: Odonata: Zygoptera: Coenagrionidae), with a note on *Agriocnemis nainitalensis* Sahni. *Dr B.S. Chauhan Comm.* 1975: 403-409.
- RAM, R. & V.D. SRIVASTAVA, 1984. *Orthetrum mathewi* Singh and Baijal 1954, a synonym of *Pantala flavescens* (Fabr.) (Odonata: Libellulidae). *Bull. zool. Surv. India* 5: 181.
- SAHNI, D.N., 1964. Some new species of Odonata from Kumaon hills (India). *Agra Univ. J. Res. (Sci.)* 13: 79-86.
- SAHNI, D.N., 1965a. Studies on the Odonata (Zygoptera) of Nainital. *Indian J. Ent.* 27: 205-216.
- SAHNI, D.N., 1965b. Studies on the Odonata (Anisoptera) of Nainital. *Indian J. Ent.* 27: 277-289.
- SAHNI, D.N., 1972. Studies on the Odonata of Kumaon — Part I. Suborder Anisoptera, family Libellulidae. *Bull. Ent., Delhi* 11 [1970]: 37-54.
- SANGAL, S.K. & B.K. TYAGI, 1984. *Calicnemia miniata doonensis* a new subspecies from the Dehra Dun valley (Dehra Dun, India) (Zygoptera: Platycnemididae). *First Indian Symposium of Odonatology, Programme, Abstracts & Souvenir, Madurai*, p. 2.
- SANGAL, S.K. & B.K. TYAGI, 1985. *Calicnemia miniata doonensis*, a new subspecies from the Dehradun Valley (Dehradun, India) (Zygoptera: Platycnemididae). *Proc. First Indian Symp. Odonatol., Madurai*, pp. 193-197.
- SINGH, A. & M. PRASAD, 1980. A new species of *Tholymis* Hagen (Odonata: Libellulidae: Libellulinae) from Uttar Pradesh, India. *Zool. Beitr., Berlin* 26: 65-68.
- SINGH, S., 1955. Entomological survey of the Himalayas. Part. V. — On two new species of Odonata. *Agra Univ. J. Res. (Sci.)* 4(1): 171-174.
- SINGH, S. & H.N. BAIJAL, 1954. Entomological survey of the Himalayas II. — On a collection of Odonata. *Agra Univ. J. Res. (Sci.)* 3(2): 385-399.
- SINGH, S., H.N. BAIJAL, V.K. GUPTA & K. MATHEW, 1955. Entomological survey of the Himalayas. Part. XIV. — Notes on some insects collected by the Second entomological expedition to the north-west Himalayas (1955), with description of three new species of Odonata. *Agra Univ. J. Res. (Sci.)* 4 (Suppl.): 741-766.
- TYAGI, B.K., 1982. Notes on some dragonflies from the Dehra Dun Valley (Uttar Pradesh, India). *Fraseria* 3: 9-10.
- TYAGI, B.K., A. TYAGI & S.K. SANGAL, 1986. An up-to-date catalogue and bibliography of dragonfly fauna of the Dehradun Valley (India). *Occ. Publ. SIO Nat. Off. India* 2: 1-14.