NOTES ON THE TAXONOMIC STATUS OF VESTALIS SUBMONTANA FRASER, 1934 FROM SOUTH INDIA (ZYGOPTERA: CALOPTERYGIDAE)

M. HÄMÄLÄINEN
Netherlands Centre for Biodiversity Naturalis, P.O. Box 9517, 2300 RA Leiden, The Netherlands; – Mailing address: Sunankalliontie 13, FI-02760 Espoo, Finland; – matti.hamalainen@helsinki.fi

Abstract – V. submontana Fraser, 1934 (type locality: India, [Tamil Nadu], Nilgiris, Gudalur) is upgraded to full species and V. gradlis montana Fraser, 1934 is synonymised with it. Distinguishing characters separating V. submontana from its South Indian congeneres are provided.

Introduction
FRASER (1929) described two new subspecies Vestalis gracilis amaena and Vestalis apicalis amaena [the use of the diphthong 'ae' was an obvious misspelling of the intended 'oe'] from southern India. Since these subspecific names were homonyms (and moreover to be confused with V. amoena Hagen in Selys, 1853), FRASER (1934) introduced the replacement names V. gradlis montana and V. apicalis submontana for these taxa. Otherwise the descriptions were almost identical with the original ones. V. gradlis montana was stated as differing from V. g. gradlis (Rambur, 1842) by only a small venational detail (only a single row of cells separating IA and Cu2) and by its smaller size. V. apicalis submontana was stated to differ from V. apicalis apicalis Selys, 1873 by the same venational detail as above, by its smaller size and by some colour differences, e.g. the genae being black and the black apex of wings being more restricted. Both of these taxa are still listed as valid subspecies in the latest catalogues of Indian dragonflies (PRASAD & VARSNEY, 1995; SUBRAMANIAN, 2009). I have studied the type specimens of these taxa and other material preserved in collections of BMNH (London), IRSN (Brussels) and RMNH (Leiden) and present here my conclusions of their taxonomic status.

Taxonomic status of submontana and montana
In the list of Odonata types described by Fraser kept at British Museum (Natural History), KIMMINS (1966) wrote for 'submontana (ssp. of Vestalis apicalis)': "Holotype ♂ [in fact lec- totype], India, Nilgiris, Gudalur, 3000 ft, 20.ix. 1922, F.C. Fraser. Vestalis apicalis submontana Fraser ♂ [labels D.E.K., transcribed from rubber stamped labels]. V. submontana(type) [label F.C.F.]. Allotype ♀. Same locality, date 9.ix.1922. V. submontana allotype ♂ [label F.C.F].". For 'montana (ssp. of Vestalis gracilis)’ KIMMINS (1966) wrote: "The types of this subspecies, which was a new name for V. gracilis amoena Fraser, have not yet been traced in the Fraser collection".

FRASER (1929) described Vestalis gracilis amaena (= montana) based on an unspecified number of specimens from “Coorg and the Nilgiri Wynaad, all specimens taken at about 3500 ft altitude”. While studying the collections at BMNH in October 2007, I found some female specimens from these two localities, which might belong to the syntype series of Vestalis gracilis amaena (= montana). The locality name, collecting date well before 1929, and distinguishing characters agree with the data given by FRASER (1929, 1934). Unfortunately, the identity of these specimens has been changed both by Fraser and later workers, older species names being struck out and new names replaced in a confusing way; in one case as many as four names: 'gradlis, apicalis, amaena and submontana' had been given to the same specimen in different times. The identification 'montana' in Fraser's hand was not found on any specimen. Additional confusion had been created when some specimens were later placed into new envelopes in the 'Cowley Collection'. For instance there are two male and one female specimens from Nilgiri Wynaad marked as 'paratype of Vestalis gracilis amoena'. However, these specimens are in fact V. g. gracilis, and in the original labels by Fraser reads only 'V. gracilis'.

It would be rather meaningless to designate one of these potential female specimens as the lectotype of montana, since the study of all available South Indian Vestalis material in the
three museums listed above showed that all available ‘amaena’[sensu FRASER, 1929] specimens can be confidently placed into a single taxon. All specimens are conspecific with the male lectotype and female allotype of the taxon submontana, as designated by KIMMINS (1966). The colour differences in the wing apex of montana and submontana, indirectly indicated by FRASER (1934), seem to be age dependent. The taxa montana and submontana were introduced in the same publication (FRASER, 1934). Although the name montana has page priority, as the First Reviser (Article 24.2.2. in the Code) I am selecting the name submontana, since its primary types are known and its original description is more detailed.

The striking structural and colour differences, discussed below, indicate that submontana is a distinct species. Its sympatric occurrence (see below) with apicalis and gracilis alone rules out its former subspecific status. Therefore, the new arrangement is:

Vestalis submontana Fraser, 1934, stat. nov.
Vestalis gracilis montana Fraser, 1934, syn. nov.

**Distinguishing characters**

The structure of male appendages of _V. submontana_ (Figs 1-2) is clearly different from that in _V. apicalis_ (Fig. 3) and _V. gracilis_ (Fig. 4). In _submontana_ the inferior appendages are proportionally longer and the apical part of the superiors is more obtuse than in _apicalis_ and _gracilis_, both of which have quite similar appendages. In both sexes of _submontana_ there is usually only a single row separating the veins IA and Cu2, whereas there is a section with two cell rows in _apicalis_ and _gracilis_. This venational character is, however, not fully reliable; in one _submontana_ male specimen studied (Anamalai Hills, Cinchona) the character state is similar to that of _apicalis_ and _gracilis_. In mature males of _submontana_ the darkened area in wing tips is more narrowly (only 2-3 mm) and less intensively coloured than in _apicalis_ (5-6 mm). The darkening is age dependent in _submontana_, in general specimens the wing tips are hyaline and in semi-mature males they are only slightly darkened. In _submontana_ females the apex of wings is hyaline also in mature specimens or at most very slightly darkened at the extreme apex, but in _apicalis_ females the apex is slightly darkened for some 5 mm. In _submontana_ the abdomen is proportionally slightly shorter than in _apicalis_ and _gracilis_. There are also distinct colour differences. For example, the genae below the base of the antennae are shining black (with only a small yellow streak at the level of the base of the mandibles, which is also yellow) in both sexes of _submontana_, but wholly bright yellow in _apicalis_ and _gracilis_. In _submontana_ the metallic green area on metepimeron is slightly larger and legs are a little darker. The size of _submontana_ specimens seems to be rather variable. In a small casual sample of 6 males and 12 females from various locations, the measurements are as follows. Male: hind wing 34-39 mm, abdomen (incl. appendages) 47-53.5 mm. Female: 35-39.5 mm and 42-47.5 mm, respectively.

**Distribution**

The BMNH houses specimens of _V. submontana_ from the following localities in southern India, all collected in 1920-1930’s: “Hallery, Mescara, Coorg”, “Maput Ghat, Coorg”, “Sambaji Ghat, Coorg, 3500 ft”, “Nilgiris, Gudalur,

In the RMNH and IRSN there are specimens from “Anamalai Hills, Cinchona, 3500ft”, “Nilgiri Hills, Devala, 3200ft”, “Nilgiri Hills, Chuangude, 3500ft”, “Kerala State, Trivandrum District, Poonnudi Range, 3000 ft”, collected in 1950-1970’s. Based on the collecting data of the specimens preserved in the three museums above, *V. submontana* has often been recorded in the same locations as *V. gracilis* and *V. apicalis*, and it may co-occur with them in the same sites. This can also be concluded from the published records of *Vestalis* taxa from Kerala.

EMILIYAMMA et al. (2007) listed both *V. g. gracilis* and *V. gracilis montana* from the same site and date (Idamaruku). *Vestalis a. apicalis* and *V. gracilis montana* were recorded from the same locality and date (Kulasekaram). EMILIYAMMA et al. (2007) characterised *V. submontana* [identified as *V. gracilis montana*] as ‘locally common’ and gave its distribution as follows: “Arunachal Pradesh and South India: Kerala: Kottayam, Kozhikode, New Amarambalam Reserve Forest, Parambikulam Wildlife Sanctuary, Thiruvananthapuram and Wayanad.” The record from Arunachal Pradesh in northern India looks very dubious, especially as the status of this taxon has been misunderstood with its identification being based on a single venational detail only. Obviously *V. submontana* is not uncommon in the remaining upland and mountain forests in southern India.

Acknowledgements – My best thanks are due to Dr DIRK GASSMANN for taking the SEM photographs and to Dr SAMI KARJALAINEN for help in editing them. Dr A.G. ORR made useful comments on the manuscript draft. I am grateful to the curators of the BMNH, RMNH and IRSN for permitting me to study their collections and for providing loans of specimens. The museum visits took place in the framework of the SYNTHESYS Project (http://www.synthesys.info/) which is financed by the European Community Research Infrastructure Action.