

AESHNA CRENATA HAGEN IN FINLAND (ANISOPTERA: AESHNIDAE)

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Abstract — All known Finnish records are revised and discussed, the breeding habitats are briefly described, and some clues for identification in the field are given.

Introduction

Aeshna crenata was discovered in Finland for the first time a little more than a century ago. The species has since been recorded nearly throughout southernmost Finland. Its general distribution forms a belt across the whole Asiatic part of the USSR, between the northern latitudes of about 50° and 60°. It has been believed that *A. crenata* can live only in the most temperate parts of Finland. Recent records, however, have induced me to revise this supposition.

Nomenclature

The species was described by Hagen in 1856. In different areas of its range it varies noticeably in size, and it has some close nearctic relatives. This has triggered both parallel species descriptions and false synonymisations.

The related taxa are: *A. arundinacea* Selys, 1872; *A. clepsydra* Say, 1839; *A. eremita* Scudder, 1866; *A. gigas* Barteneff, 1908; *A. hudsonica* Selys, 1875; and *A. maxima* Heikel, 1861.

MARTIN (1908) treats *clepsydra* and *hudsonica* as two different species. All the other known taxa, i.e. *arundinacea*, *crenata*, *eremita* and *maxima* were synonymised with *A. clepsydra*. NEEDHAM & WESTFALL (1954)

discern two North American species: *A. clepsydra* (= *arundinacea*, = *maxima*!) and *A. eremita* (= *hudsonica*). It is odd that here the European (= Finnish) *A. maxima* is connected with an American species, while *A. crenata* is at the same time omitted. DAVIES & TOBIN (1985) follow the preceding system, adding the non-American *crenata* and *gigas*, although BELYSHEV (1973) has already used the right synonymisation between these two species (cf. also VALLE, 1921). To make the system even more complicated, D'AGUILAR et al. (1985) synonymise *A. crenata* with both *A. maxima* and *A. eremita* (!).

The above taxa actually represent only three species, i.e. the Old World *crenata* and the New World *clepsydra* and *eremita*. At least the males of these are easily distinguished by the anal appendages and by the genitals. The synonymisation is as follows:

- *A. crenata* Hagen (on average medium-sized Mid- and East Siberian specimens) = *A. gigas* Barteneff (larger and robuster individuals from western Siberia) = *A. maxima* Heikel (European, in size and stature similar to West Siberian specimens);
- *A. clepsydra* Say = *A. arundinacea* Selys; *A. eremita* Scudder = *A. hudsonica* Selys.

Identification of *A. crenata* in the field

In the hand, the species can be easily separated from its allies, but its recognition on the wing is more complicated. If males are seen in (typical) territorial flight the determination is not dif-

ficult. The route during this flight is a closed loop, often elliptic or nearly circular but not a straight or zigzagged line forwards (and back) as in other similar species, i.e. *A. juncea*, *A. subarctica* and *A. caerulea*. In other situations, the greater size and the deep blue coloration serve as distinctive features from *subarctica* and from *caerulea*. Yet, the *juncea* males can be a source of errors. Their coloration is not constant to the same extent as in the preceding species. It can vary from nearly blackish or dark blue (as in *subarctica*) to deep blue (as in *crenata*) or even bright blue (as in *caerulea*). Therefore one must be very careful not to confuse the *juncea* males with those of *crenata* in the field. Females are again rather easy to recognise on wings. The size, the robustness and the coloration, especially the fumed spots in the middle of the wings are characteristic. Also the occasional bending the abdomen under the body (in flight bringing the appendages close to the mouth parts) is a unique distinctive clue in the field.

Finnish records

- (1) The first Finnish record comes from O.A. Heikel, who in July and August 1860 collected several individuals of both sexes in Nummi. From this material he described (in HISINGER, 1861) his *A. maxima*. The fate of Heikel's material is not known, most likely the specimens are lost. Also the exact location of the locality is unknown, and it is obvious the population is now extinct.
- (2) The second record originates from Hanko (Üblom leg.), the date is unknown, but it surely lies before 1920. VALLE (1920) refers to 2 males, one of which (no date label) is in the collections of the Zoological Museum of the University of Helsinki (HEL). The original locality is unknown, but the population is certainly extinct, since all possible breeding habitats for this species in the Hanko area are now destroyed.
- (3) VALE (1920) refers to 2 females from Espoo (= Esbo), taken by Mr Cedercrutz. Apparently, the same collector gathered some more material at the same place, since in the HEL collection there is another pair from Espoo, without date, and VALLE (1921) has examined 5 specimens from this locality. The exact locality is unknown, but the population is certainly extinct. This is a densely populated and well explored area, and no subsequent records are known from there.
- (4) According to VALLE (1936), Dr A. Luther collected this species at Tvärminne. Again, the precise locality, date and number of specimens collected are unknown. In Finnish museum collections there is not a single specimen from this place. The population is surely extinct. Most of the suitable breeding habitats are destroyed, and we do not know any later *crenata* records from this very well studied area.
- (5) In July 1932, A. Luther collected some specimens in South-Häme. There is some confusion as to the exact locality. According to VALLE (1936) the record is from Janakkala, Saarenpää, lake Likolampi. In the HEL-collection there is one male labelled "Lammi, Likolampi, 24.7.1932, Alex. Luther". Dr Erkki Laasonen (Helsinki) has in his private collection two specimens, one labelled "Janakkala, Saarenpää, Likolampi, 24.7.1932 Alex. Luther", and the other "Lammi, Likolampi, 24.7.1932, Alex. Luther". In fact, Janakkala parish has no small lake called Likolampi, but at Janakkala's northern border, in Hämeenlinna (formerly Vanaja), one can find a lake named Likolampi on a map. I have visited both this place and the Likolampi in Lammi parish. Both lakes look like potential places for the record, but if the discovery was made at either of these Likolampi-lakes the population is now extinct.
- (6) Valle and Niemelä have collected *crenata* from Perniö in August 1934. Two males and two females from this series are deposited in the collections of the Zoological Museum of Turku University (= TUR). Whether this population is extant or extinct is not known.
- (7) VALLE (1936) gives one more record from Taipalsaari (Aro leg.) No more data are stated, and the exact place and the present condition of this population are

- unknown. No specimens from this place can be found in any Finnish public collection.
- (8) Valle himself found *crenata* at Kalvola in 1948. There, at Paskolampi, he collected a good series in 1948 and 1952; 18 ♂ and 2 ♀ are in the TUR-collection. I have visited thice this place, but could only verify the extinction of the species.
- (9) L. Tiensuu writes in his private "Aquatic Diary" that he saw a *crenata* female (13-VII-1964) and tow males (18-VII-1964) in Vehkalahti. The localities are at a brook, Sinkelinoja, and in a nearby open place in the forest. Tiensuu was not able to catch any specimens. Dr Matti Hämäläinen and I have visited Vehkalahti several times, but we have not met this species. I must, therefore, assume that the population is extinct.
- (10) Dr Hämäläinen took one female at Parikkala, 4-VIII-1970. The place has not been visited later.
- (11) Mr J. Kuusinen has written me that he found (but did not collect) a dead female in Iitti, 28-VIII-1972.
- (12) He also notified me that he had seen a male on wings in Orimattila, on the Porvoonjoki R., 18-VIII-1974.
- (13) A further observation was made by Mr Kuusinen in Nastola, between the Kymijärvi and Kärkjärvi lakes, 24-VIII-1974. This time a male was seen in flight.
- (14) A very good record was made by Mr Kristian Westman in 1982. He found *crenata* in Jaala at a small forest lake. It was soon shown that the species lives also in a second lake very nearby. The populations of these lakes are relatively strong and they seem not to be threatened. Several specimens from this place, which stayed for years the sole known extant *crenata* population in Finland, are in some private collections.
- (15) In the same year a Danish entomologist, C. Martin, collected *crenata* in Liperi (8-VIII-1982). The place is indicated relatively exactly, but Dr Hämäläinen could not find it when he visited that area. The discovery was most interesting because the locality is situated about 100 km North of

the earlier known Finnish range.

- (16) Another 100 km North, the species was discovered by the author in Nurmes. It was found at a typical small forest lake. About 5 males were seen at the lake and in the surrounding forest. This seems to be a good permanent population. One specimen was taken for the author's collection, 21-VII-1987.
- (17) Only two days later, the author captured a male on a river in Nurmes, about 15 km E. of the preceding locality.

Discussion

The distribution of *A. crenata* in Finland has changed markedly during the last 30 years. A dragonfly with previously southern distribution appears today an eastern, rather than a southern species. In fact, five of the seven populations found West of the line Helsinki-Jyväskylä are with certainty extinct nowadays. Also the extinction of the other two populations seems to be very probable. In addition, all new records (after 1960) have been made East of the mentioned line.

In some cases, the destruction of the habitat is clearly responsible for the population extinction. Thus, the drainage has been the primary reason in Hanko (record 2) and in Tvärminne (record 4). If record No. 5 is from Lammi, the extinction was caused by the natural vegetation succession. The loss of the Espoo population (record 3) could be due to demographic development. In other cases, the reasons for the disappearance are more complicated. For example, if record No. 5 is from Hämeenlinna (Janakkala), the Likolampi lake is in a perfect natural condition, and so is the Paskolampi in Kalvola (record 8). Likewise, the populations lost in Nummi (record 1) and in Perniö (record 8) cannot be explained by the environmental changes. This also holds true for the Vehkalahti population (record 9).

Generally, *A. crenata* has disappeared from its westernmost localities and most of the costal places. On the other hand, it recently occurs in the eastern parts of the country, up to about 63.5°N, i.e. in an area characterised by a more continental climate. Since its biology is still insufficiently known, it may be too early to maintain that the distributional changes could

be due to climatical alterations.

The habitat requirements represent another interesting question. In the literature these are described as small forest lakes, with a well developed *Sphagnum* border. It seems that the larvae live in water pockets within or beneath the moss layer. A different type of habitat was also suggested. In his "Aquatic Diary" Tiensuu mentions *crenata* from a brook in Vehkalahti (record 9), though in the neighbourhood there is also a forest lake. Mr Kuusienien gives a similar information for his records from Iitti and Orimattila (records 11 and 12, resp.). There is a nearby lake in Iitti, but not in Orimattila. It is worthwhile to note that only sight records are available from such habitats. Therefore my own record (No. 17) from Nurmes is interesting. The river on which a *crenata* male was taken, is running through a large forest country. At the place of capture the current is slow and the banks are covered with *Sphagnum*. The nearest appropriate forest lake is at a distance of 2 km. Anyhow, whether or not *crenata* breeds in the river still needs to be evidenced by larvae or exuviae. It is interesting to note that *A. subarctica*, *juncea*, *grandis* and *cyanea* often co-occur with *A. crenata*. In Jaala these five species are met in the same lake. With the exception of *subarctica*, all the other relatives of *crenata* also occur in running waters. It is not

unlikely, therefore, that *A. crenata* may breed in appropriate places of slowly running streams.

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