

A new subspecies of *Poecilimon veluchianus* Ramme, 1933 (Tettigonoidea, Phaneropteridae) from Greece

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**Abstract**

*Poecilimon veluchianus minor* ssp. n. differs from the nominate subspecies by its smaller body size. The heritable differences in body size, partial hybrid infertility with the nominate form (REINHOLD, in press) and an allopatric distribution make a classification of this form as subspecies of *P. veluchianus* most appropriate. *P. veluchianus minor* occurs in the eastern part of the distribution range of *P. veluchianus* (northeast and northwest of Lamia, N. Fthiothis, Central Greece).

**Zusammenfassung**

*Poecilimon veluchianus minor* ssp. n. unterscheidet sich von der Nominatunterart durch seine geringere Körpergröße. Die erblichen Unterschiede in der Körpergröße und partielle Infertilität der Hybride mit der Nominatunterart (REINHOLD, im Druck) sowie ein allopatrisches Verbreitungsgebiet lassen eine Einstufung als Unterart von *P. veluchianus* als angebracht erscheinen. *P. veluchianus minor* kommt im Osten des Verbreitungsgebiets von *P. veluchianus* vor (nordwestlich und nordöstlich von Lamia, N. Fthiothis, Mittelgriechenland).

The genus *Poecilimon* is one of the largest bushcricket genera in Europe. The center of its distribution is to be found in the East Mediterranean with at least 41 species in Greece (WILLEMSE & HELLER 1992) and 51 species in Turkey (CIPLAK et al. 1993). Typically, different species can be recognized by the different structure of the male cerci. In some cases, however, species can be best or even only separated by analysing the male calling song pattern (e.g. *P. obesus* / *artedentatus* HELLER 1984; *P. chopardi* / *P. mariannae* WILLEMSE & HELLER 1992). But even in these cases speciation seems to be complete with the species involved genetically isolated.

In the following we describe a case of speciation in progress where a certain amount of gene flow between both forms probably exists. *Poecilimon veluchianus minor* ssp.n. differs from the nominate subspecies mainly in body size, consistent

differences in the shape of male cerci and in song pattern (for differences in frequency see below) were not observed. In crossing experiments it has been shown that representatives of both forms mate easily. The hybrid  $\sigma^{\sigma}$ , however, are largely infertile (REINHOLD, in press). Due to this partial reproductive isolation, the geographic separation of both forms and the constant and heritable differences in body size (REINHOLD, in press), a classification of the smaller form as a new subspecies seems most appropriate.



Fig. 1. Localities of *Poecilimon veluchianus minor* (▲) and *P. v. veluchianus* (●) in Central Greece (indicated are the river Sperchaios, coast line and the 600 m contour line, areas above 1400 m are hatched, above 2000 m black; K town of Karpenision)

*Poecilimon veluchianus minor* ssp. n.

**Type material:**

♂ holotype, ♀ allotype (both formerly preserved in 70% ethanol), 16 ♂♂, 2 ♀♀ paratypes (preserved in 70% ethanol); labelled: Greece, Central Greece, Nomos Fthiotis, 4 km west of Makrakomi, below the village of Tsouka, 330m N.N., 23.V.1988, leg. K.-G. Heller & K. Reinhold; deposited in Collectio Heller, University Erlangen-Nürnberg, except 1 ♂, 1 ♀ in Collectio F. Willemse. The animals (locality 8 in Fig. 1) were used in field experiments and bear markings of white or silver colour.

Other material studied (numbers in brackets refer to localities shown in Fig. 1): (7) 8 ♂♂, 6 ♀♀, 5 km W Makrakomi; (13) 7 ♂♂, Trilifo, NW of Lamia, 400 and 800 m; (15) 3 ♂♂, 20 km E Makrakomi, 50 m; (16) 17 ♂♂, 7 ♀♀, Ag. Ekaterini, 2 km N Fourka-Pass N Lamia, 700 m; (18) 3 ♂♂, 1 ♀, Mt. Othris above Kokkotoi, 1000-1500 m, examined by F. Willemse.

Material of *P. veluchianus veluchianus*, used for comparison (numbers in brackets refer to localities shown in Fig. 1): (1) 10 ♂♂, 3 ♀♀, Mt. Timfristos above Karpenision, 1500-2000 m; (2) 4 ♂♂, 5 km E Karpenision, 900 m; (3) 1, Rentina, 800 m; (4) 7 ♂♂, 1 ♀, Ag. Georgios, 300 m; (5) 35 ♂♂, 50 ♀♀, Vitoli, 330 and 600 m; (6) 11 ♂♂, 9 ♀♀, Loutropigi, 400 m; (9) 11 ♂♂, Makrirahi, 800 m; (10) 22 ♂♂, Makrakomi, 200 m; (11) 14 ♂♂, 6 ♀♀, 1 km N Mesokhori, 550 m; (12) 4 ♂♂, 1 ♀, Pirgos, 800 m; (14) 12 ♂♂, 7 ♀♀, Lichno, 700 m; (17) 22 ♂♂, 14 ♀♀, 4 km E of village of Oiti, 400 m; specimens from Mt. Tzoumerka, Mt. Valtou, Khrisomilea and Polidrosos (see WILLEMSE & HELLER 1992), examined by F. Willemse.

**Diagnosis:**

*P. veluchianus minor* differs from the nominate subspecies by its small body size. The length of the male pronotum is usually less than 5.0 mm, compared to more than 5.0 mm in *P. veluchianus veluchianus* (Fig. 2). The population means of hindfemur length are below 16 mm in the male, and 18 mm in the female, compared to above 16 mm and 18 mm respectively in *P. v. veluchianus*, but the ranges overlap widely. The same is true for the number of teeth on the stridulatory file (x+S.D.: 70+5 in *P. v. minor*, 73+4 in *P. v. veluchianus*, n = 10 for each subspecies).

**Description:**

In general morphology no differences were found to the nominate subspecies (see description of the nominate subspecies by WILLEMSE 1982 (as *P. chopardi*) and 1985). No consistent difference could be observed in the shape of the male cercus either.

### Song:

No differences between the subspecies were observed in the amplitude pattern of the song (see song description by HELLER 1988) and the females showed no preference for the song of males of their respective subspecies (unpublished results) in phonotaxis tests. The mean of the frequency spectrum (measured 6 dB below its peak), however, was slightly, but significantly higher in *P. v. minor* ( $\bar{x} \pm \text{S.D.}$ ;  $27.3 \pm 1.4$  kHz,  $n = 7$  males) than in *P. v. veluchianus* ( $24.8 \pm 0.7$  kHz,  $n = 8$  males; U-test,  $p < 0.01$ ; Fig. 3), probably due to the smaller body and elytra dimensions in this subspecies. Additionally the frequencies above 40 kHz were more pronounced than in the nominate subspecies. (Song recordings were made in the field at a distance of 10 cm dorsally from the singing male using a Brel and Kjaer 6.25 mm microphone 4133, a B & K amplifier 2231, and a videorecorder modified to register sound (frequency response flat from 1 to above 60 kHz). Frequency analysis (power spectra of complete syllables) was performed on a MOSIP computer (programm SPEKTRO 6.0, Fa. MEDAV).)

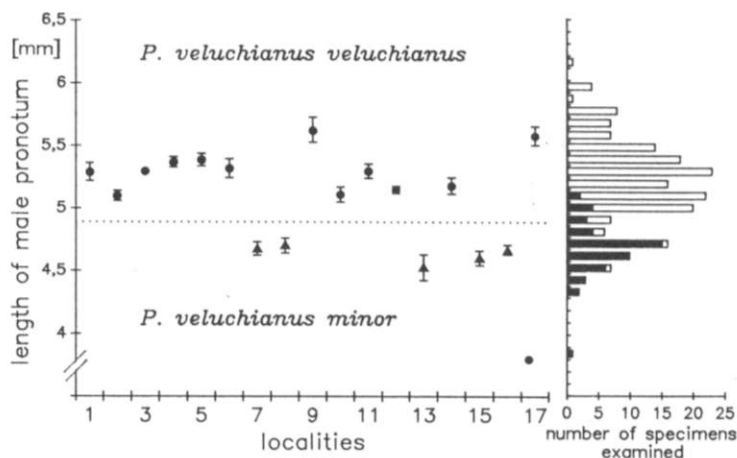


Fig. 2. Male pronotum length ( $\bar{x} \pm \text{S.E.}$ ) in *P. veluchianus minor* ( $\blacktriangle$ ) and *P. v. veluchianus* ( $\bullet$ ) at the localities shown in Fig. 1 (see Fig. 1 and text for localities with the number of specimens examined). The distribution at the right includes all specimens studied.

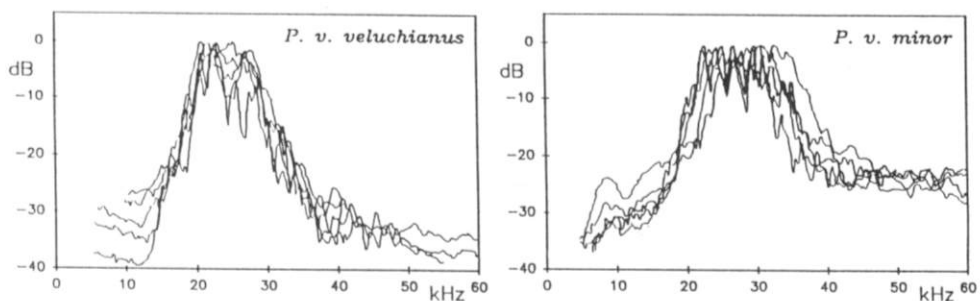


Fig. 3. Power spectra of complete syllables of the calling song of five *P. veluchianus minor* and *P. v. veluchianus* males

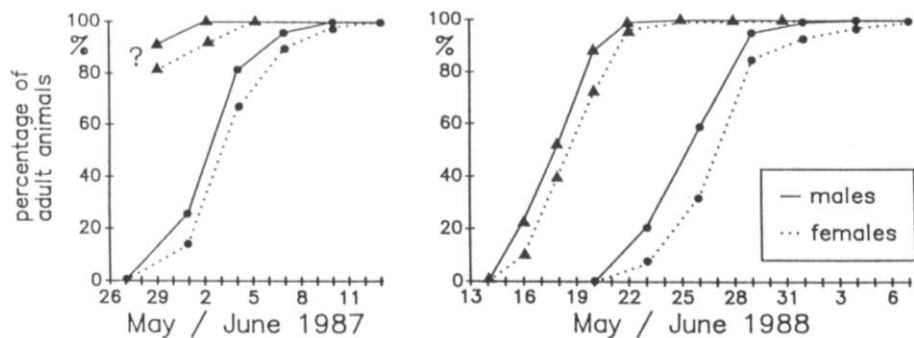


Fig. 4. Timing of imaginal molts in *P. v. minor* (▲) in Tsouka (loc. 8 in Fig. 1) and *P. v. veluchianus* (●) in Vitoli (loc. 5 in Fig. 1) in 1987 and 1988

**Measurements:**

Pronotum ♂ 3.8 - 5.1 mm, ♀ 4.8 - 5.8 mm, hind femur ♂ 13.8 - 16.3 mm, ♀ 16.0 - 17.9 mm, ovipositor 7-7,5 mm; all measurements were made with dial calipers on ethanol preserved specimens (subtract 6% for comparison with dried specimens).

**Distribution:**

*P. v. minor* is found in the valley of the river Sperchaïos, from the Aegean sea up to the village of Makrakomi, and in the hills bordering that part of the valley in the North. It is also found on Mt. Othris, north-east of Lamia (Fig. 1).

**Remarks:**

The heritable differences in body size and the partial hybrid infertility (REINHOLD, in press) clearly indicate that the small animals described above are genetically distinct from the large animals of the nominate subspecies. When the population of *P. v. veluchianus* in Vitoli /Litoselo and that of *P. v. minor* in Tsouka, separated by a distance of 6.5 km, were compared, it was evident that the smaller animals in Tsouka reached adulthood noticeably earlier than the large ones in Vitoli (Fig. 4). Thus small body size may allow *P. v. minor* to emerge earlier in the season than the large *P. v. veluchianus*. The adaptive significance of this may be that the foodplants in the eastern lowlands dry out much earlier than those in the mountainous habitats where *P. v. veluchianus* is found.

Close to the village of Makrakomi, the subspecies are separated by a distance of only a few kilometers, but we have not as yet found a hybrid population. Some differences in the mating behaviour between the subspecies will be described by HELLER & REINHOLD (in prep.).

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