Two new bush-crickets from Greece, *Leptophyes lisae* sp. nov. and *Platycleis* (*Parnassiana*) *tenuis* sp. nov. (Orthoptera: Tettigoniidae)

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Abstract: Descriptions and bio-acoustic data are given of *Leptophyes lisae* sp.nov. (Phaneropterinae) and *Platycleis* (*Parnassiana*) *tenuis* sp.nov. (Decticinae), both from Greece.

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Introduction

During the last decades much work has been done on taxonomy and faunistics of the Orthoptera of Greece. Current research on bioacoustics has also considerably improved our taxonomical knowledge. As a result quite a number of new species from the Greek mainland has been described and it was assumed that this part of Greece had been thoroughly explored. However, most of these recently described species have a small or very small distribution range, so that new species still can be expected in the mainland of Greece as shown in this paper. One of the now described species was found on the somewhat isolated Mt. Tzoumerka of the western central Pindhos range. The other species described here was detected largely by its distinctive song. The ranges of both species are quite restricted.

Methods

For the recordings of the songs the following equipment has been used: UHER 4200 Report Monitor and AKG D 202 E microphone with low frequences off (after modification) (*P. tenuis*, *tymphiensis*, *nigromarginata* & *panaetolikon*-like sp.); UHER 4200 IC and microphone UHER M 517 (*P.tenuis*), tape speed always 19 cm/s; RACAL store 4D with microphone 4433 and amplifier 2606 (BRÜEL & KJAER) (*P. tymphrestos, panaetolikon*-like, *Leptophyes* species). The wing movement was registered by an opto-electronic device (for details compare v. Helversen & Elsner, 1977, Heller, 1986 & in press). Oscillograms were obtained by using an oscilloscopecamera (TÖNNIES Recordine K 831). The stridulatory files were studied with a light microscope and a SEM (Institut für Zoologie I, Universität Erlangen).

For a better quality of the recordings, the songs were recorded in captivity. Registration of the wing movements was done in the laboratory of the Institut für Zoologie, II, Universität Erlangen. Full data of the recordings can be obtained from the authors.

Song terminology is as follows:
Calling song: the song produced by an isolated male.
Impulse: the sound produced by the contact of one file tooth with the scraper.
Syllable: the sound produced by one opening and closing movement of the fore wings (irrespective of whether these movements are long or short).
Hemisyllable: the sound produced by an unidirectional movement (opening or closing) of

Map. Distribution in Greece of *L. punctatissima* and *lisae* sp.n.

the fore wings in a syllable in which sound is produced by both the opening and closing movements of the fore wings.
Echeme: a first-order assemblage of syllables.
Echeme-sequence: a first-order assemblage of echemes.

Material and acknowledgements

All material has been collected recently. Depositories are abbreviated as follows: (BMNH) British Museum (Natural History), London; (CH) Collection Heller & (COVH) Collection O. von Helversen, both Institut für Zoologie, Erlangen-Nürnberg; (CW) Collection Willemse, Eygelshoven; (ITZA) Instituut voor Taxonomische Zoölogie, Amsterdam.

We are most grateful to Dr. D. R. Ragge, who provided valuable comments on bioacoustic terms and some parts of the paper. Particular thanks are due to Ms. Elisabeth Blümm for collecting and taking care of nymphs of the new species of *Leptophyes*.

***Leptophyes lisae* sp. nov.**

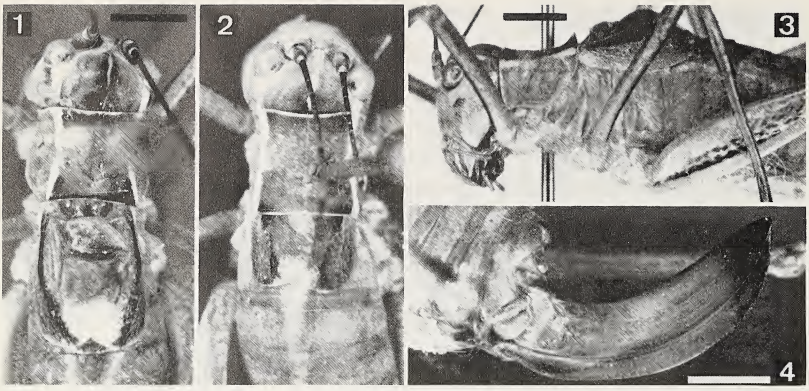
(figs. 1-4, 10-11, 12-13, 15, map)

Leptophyes punctatissma: Willemse, 1984: 31, map 8 (partim); 1985a: 10 (as aberrant form).
Leptophyes lisae sp.nov. Heller, 1986 (thesis, unpublished).

Types: ♂ Holotype, ♀ allotype, 4 ♂, 2 ♀ paratypes: Korinthia, SE of Korinthos, macchia above coastal road Isthmia-Epidauros, bay of Almiri, iv.1984 (2 ♂, 1 ♀ paratype) & iv.1985 (♂ holo-, ♀ allo-, 2 ♂ 1 ♀ paratypes), E. Blümm (all as nymphs) (all CH); other paratypes: Korinthia, 3 km N of Sofikon, 300 m, 6.vii.1974, F. Willemse (1 ♂, 3 ♀ CW); Arkadhia, Mt.Parnon, Sitaina, 800 m, 18.vi.1986, F. Willemse (1 ♂, 2 ♀ CW); Lakonia, Mt. Taiyetos, above Anoyia, 1200 m, 28.vii.1971, F. Willemse (1 ♂, 1 ♀ BMNH; (1 ♂, 1 ♀ ITZA; 8 ♂, 5 ♀ CW).

Description

Male small, slender.
Head: fastigium of vertex short, narrow, about half as broad as scape or a little less.
Thorax: pronotum (figs. 1 & 3) short, not reaching beyond hind margin of mesonotum; dorsum slightly concave in lateral view, hind margin appreciably upcurved, fore and hind margin straight or slightly concave in dorsal view; lateral lobe a little longer than high, lower margin short, extending over fore half of pronotal length, straight or slightly sinuate, fore margin straight or slightly convex, hind

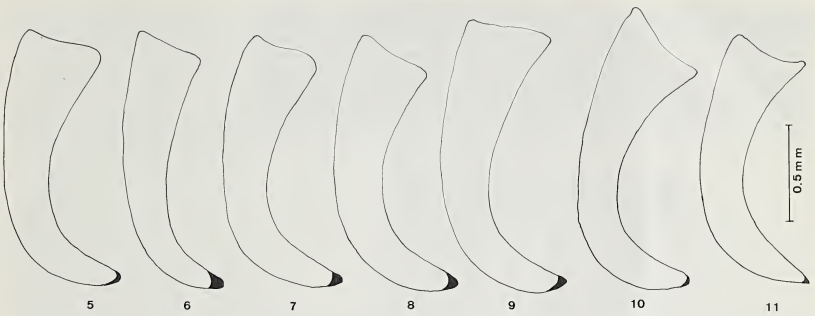


Figs. 1-4. *Leptophyes lisae* sp.n. 1, male, head and thorax in dorsal view (holotype); 2, female, head and thorax in dorsal view (allotype); 3, male, head and thorax in lateral view (holotype); 4, ovipositor (allotype) (Scale = 2.2 mm).

margin more or less broadly convex. Prothoracic spiracle large. Fore wings not covered by pronotum except base laterally, as long as or a little longer than pronotum, apical margin reaching from middle third to just beyond hind margin of second tergite; veins, archedictyon and bulging of distal end of Cu2 on hind margin rather pronounced; stridulatory file of left elytron (figs. 12-13): as seen from below arcuate, reaching almost hind margin of elytron, narrow, roughly evenly broad along proximal two thirds, increasingly narrowing in distal third; in profile concave proximally, remainder from slightly concave to almost straight, sometimes weakly bulging in distal third; number of teeth 90-120, roughly regularly spaced; teeth shaped as in fig. 13. Hind femur with inner and outer lower keels usually spinulose, number of spines on each keel variable (3-8); in a few specimens, however, completely unarmed or with one spinule only.

Abdomen: second tergite a little inflated and bristle-like hairy mediodorsally. Cercus (figs. 10-11) slender, cylindrical, evenly curved inward throughout apical half, shortly tapering apically into a slightly downcurved, pointed or sometimes crest-shaped, denticle. Subgenital plate extending well beyond tip of cerci, ventral surface with a low median and on either side a lateral keel; lateral margins tapering posteriorly; hind margin straight or slightly convex, not or weakly notched laterally.

Colouration: general colour green or brownish green; thorax, abdomen and legs finely rusty brown spotted. Flagellum of antennae from blackish to pale brown, sparsely annulated with yellow. Head from yellowish green or creamy white to rusty brown; cheeks sometimes green; vertex and first two antennal segments usually rusty brown with a narrow median and a wider postocular yellow or creamy white stripe often bordered with black markings. Pronotum with dorsum dark to pale rusty brown, pro- and metazona darker than mesozona, fore and hind margins occasionally black, on either side always a yellow or creamy white lateral band; lateral lobe green or pale yellowish green. Fore wings with stridulatory apparatus rusty brown, a complete or incomplete black lateral streak along longitudinal folding of the wing, anterior areas and apex of elytron mostly green or yellowish green or yellowish white, stridulatory vein sometimes green or pale yellowish white. Abodmen green or brownish green, often with a wide rusty brown median band; last tergite often darker brown, occasionally green or blackish laterally; sternites and subgenital plate pale brown



Figs. 5-11. *Leptophyes*, left male cercus in dorsal view. 5-9, *punctatissima* from Greece; 5, Kastoria, Neapolis; 6, Akhaia, Kalentzi; 7, Kefallinia; 8, Messinia, Artemisia; 9, Lakonia, Mavrovouni; 10-11, *lisae* sp.n., paratypes; 10, Sofikon; 11, Mt.Taiyetos.

to dark rusty brown, in the latter case sternites yellowish medially. Cerci brown, tip black. Legs of general colour, lower keels of fore and mid femora often black, sometimes also upper side of one or more pairs of tibiae; apical part of tibiae and all of the tarsi a little darker brown or green.

Bio-acoustics (fig. 15): male calling song consisting of a single syllable which, as far as known to us, may be repeated at variable intervals of 0.5-3 s (20-28 °C). Each syllable produced only by closing the fore wings, lasting about 140-150 ms (20 °C) and divided by a momentary break in the sound into two groups of more than ten impulses. Impulses of the first group showing some crescendo and produced after longer intervals than those of the second group that are faster and louder. Highest level of the carrier frequency of the song between 20-30 kHZ (Heller, 1986 & in press).

Female: as male. Pronotum slightly less concave. Fore wings (fig. 2) short, broadly overlapping each other dorsally, reaching distal third of first tergite, distinctly shorter than pronotal length. Basal fold of lower ovipositor valve (fig. 4) lamelliform, extending laterally and bulging downward, forming with gonangulum a comparatively large pit that opens laterally. Ovipositor (fig. 4) with margins parallel in basal half, upper margin almost straight in apical half, in mid third scarcely wider than in basal and apical third, a little less than three times as long as pronotum, lower margin of apical third finely serrate, upper margin of apical half obtusely dentate. Colouration as in male but more unicolorous; ovipositor green or partly brown, serrate part of margins blackish brown.

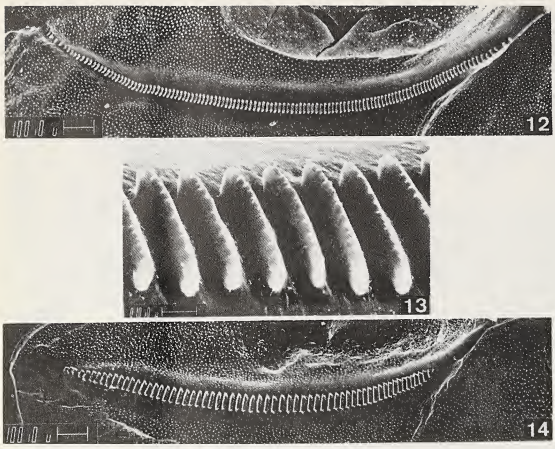
Measurements (length in mm): body ♂ 12.0-14.0, ♀ 12.0-16.0; pronotum ♂ 2.3-2.6, ♀ 2.7-3.0; elytron ♂ 2.6-4.0, ♀ 1.9-2.3; hindfemur ♂ 13.9-15.0, 14.8-16.5; ovipositor 7.2-8.7.

Variation: some variation in colouration is noteworthy. The specimens from the lowlands all are quite vividly coloured, but the colouration of those from Mt.Taiyetos, at 1200 m altitude, is less glaring and resembles much the usual colouration of *L. punctatissima*.

Differential diagnosis

The new species is defined in both sexes by measurements, colouration, pronotum and almost always spinulose hind femora, in the female by the ovipositor and its lateral basal groove and in the male by the cerci, fore wings and largely by the stridulatory file and song.

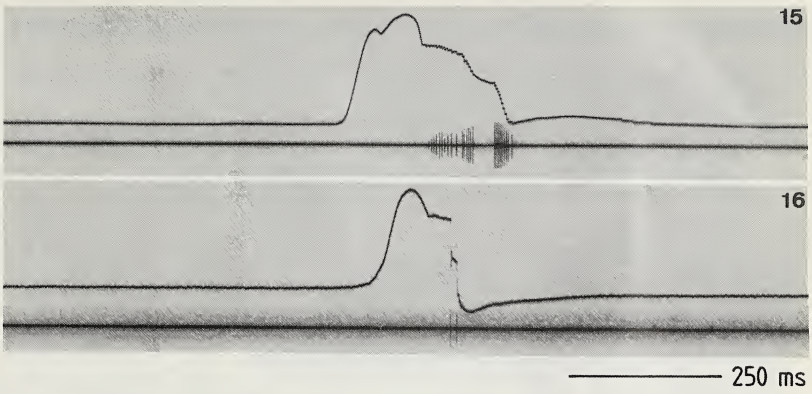
The species is very close to *L. punctatissima* (Bosc. 1792). Distinction between the female of



Figs. 12-14. *Leptophyes*, stridulatory file of left male fore wing. 12-13, *lisae* sp.n., paratype, bay of Almiri; 14, *punctatissima*, Greece, Kastoria, Grammos Mts., W of Pendalofos.

both species is sometimes difficult: the lateral pit of the ovipositor base in *L. lisae* is larger, but in dried specimens the difference may be unrecognizable by shrinkage; the hind margin of the pronotum in the new species is more upcurved than in *punctatissima*, but the degree of difference is quite small; the colouration in *lisae* may be apparently more glaring than in *punctatissima* but also similar to that of the latter. The male differs in the slightly more concave pronotal dorsum, larger fore wings, more incurved cerci and sometimes in more garish colouration. But these differences are also sometimes very small and almost unrecognizable, due to variation both in *L. punctatissima* and *lisae* (compare shape of male cercus in both species, figs. 5-9 & 10-11). Reliable characters of *L. lisae*, however, are found in the stridulatory file and calling song of the male. In order to study the variation of the stridulatory file in *L. punctatissima* we examined our material that covers a large part of its range, from Sweden to north-west Spain and from western Europe to the southern Balkans. In most populations the number of stridulatory teeth is 60-70 but in a few populations the number is larger, varying between 70-90. Besides, the file of the specimens with this larger number of teeth differs in its distal third that bulges apparently more than in the typical form. This type of file we found in the males from some southern Greek localities: S. Lakonia (Mavrovouni, W of Yithion, 10 m, 12.vii.1987, F. Willemse, 7 ♂ 8 ♀), W. Messinia (Artemisia, 900 m, W. Taiyetos range, 23.vii.1970, Willemse & Scherpbier, 2 ♂) and the Ionian island of Kefallinia (lake Avikon, near A. Nikolaos, 100 m, 5.vii.1986, L. Willemse, 2 ♂ 1 ♀). The song of one of these populations (from Mavrovouni) has been analysed. As no difference was found with morphologically typical *L. punctatissima*, we consider them conspecific with the latter. Comparison of the file of *L. lisae* and *punctatissima* reveals that the file in the latter (fig. 14) is wider, slightly shorter and the number of teeth (up to 90) always less than in *lisae* (90-120) (fig. 12). The individual teeth of the file in *L. punctatissima* and *lisae*, however, are not different.

Calling song and wing movement of the new species (fig. 15) are remarkably different from *L. punctatissima* (fig. 16). In the latter species both closing of the wings and the produced sound are apparently shorter and the number of resulting impulses much smaller, being (1-)2 - 8 (Hartley & Robinson, 1976; Ahlen & Degn, 1980; Duijm & Kruseman, 1983; Robinson et



Figs. 15-16. *Leptophyes*, synchronous registration of left fore wing movement (upward = opening, downward = closing of wing) and calling song of a male. 15, *lisae* sp.n., paratype, bay of Almiri, recorded 18.vi.1984, air temp. 19.5 °C; 16, *punctatissima*, Greece, Evritania, Vrakha N of Karpenision, K.-G. Heller, collected 18.viii. & recorded 23.viii.1981, air temp. 22.5 °C.

al., 1986; Heller, 1986 & in press). Also the highest level of the carrier frequency of the song in *L. punctatissima*, being about 40 kHz is higher than in *L. lisae* (20-30 kHz) (Ahlen & Degn, 1980; Robinson et al., 1986; Heller, 1986 & in press). The latter difference, however, may refer to the different size of the fore wings, which are smaller in *L. punctatissima* than in *lisae*. It is noted here that occasionally in both species an isolated impuls may follow 20-30 ms after the calling song as described above.

Distinction from all others members of the genus is obvious (compare Beî-Bienko, 1954; Giglio Tos, 1893; Harz, 1969, 1970; Heller, 1986 & in press, including bio-acoustics of European species).

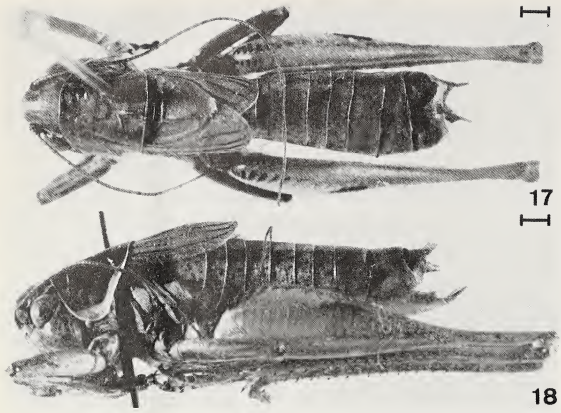
Distribution and habitat

The species is known with certainty from the eastern Peloponnisos, Korinthia: bay of Almiri (type-locality) and Sofikon; Arkadhia: Sitaina and Lakonia: Mt.Tayetos, above Anoyia. We have some other material before us from: the Peloponnesian part of Attiki, Ano Fanari, SE of Epidauros, 550 m, 3.vii.1974 (2 ♀); Lakonia, Mt.Parnon, Vamvakou, 950 m, 27.vii.1978 (1 ♀), both F. Willemse; Kikladhes, Andros I., S of Varidhion, 120 m, 10.vi.1979, A. Malicky (1 ♀) (all CW). Although colouration and morphology agree with *L. lisae* rather than with *punctatissima* definite identification of this material has to be postponed as it refers only to female specimens without associated males. Opportunity is taken here to give a distribution map of *L. lisae* and a revised one of *punctatissima* in Greece based on re-examination of material before us: CH, CW, material recorded in Ingrisch & Pavicevic, 1985 (map).

Relatively little is known of the habitat. The nymphs at the type locality were found on flowers of an orchid (*Ophrys* sp.), while adults were collected on various shrubs and herbs.

***Platycleis* (*Parnassiana*) *tenuis* sp.nov.**
(figs. 17-32)

Types: ♂ Holotype, ♀ allotype, 7 ♂, 14 ♀ paratypes: Hellas (Arta) Mt.Tzoumerka, S of Theodhoriana, 1400-1800 m, 24.vii.1987, F. Willemse (CW, except 1 ♂ 1 ♀ paratype BMNH; 1 ♂ 1 ♀ paratype ITZA); other paratypes: Hellas, Tzoumerka Geb., Theodoriana, Gipfel, 2200 m, 18.viii.1965, O. v. Helversen (1♂ 1 ♀ COVH); Greece, Tzoumerka-Geb., östl.Arta, 5.viii.1978, K.-G. Heller (1 ♂ CH); Hellas (Arta) Mt.Tzoumerka 1400-1600 m, SW of Theodhoriana, 17-18.viii.1988, F. Willemse (11 ♂ 16 ♀ CW); Hellas (Arta) Mt.Tzoumerka 1400-1800 m, N of



Figs. 17-18. *Platycleis* (*Parnassiana*) *tenuis* sp. n., male paratype (SW of Theodhoriana, 1988) (Scale = 1 mm).

Voulgareli, 18-19.viii.1988, F. Willemse (10 ♂ 12 ♀ CW, except 1 ♂ 1 ♀ CH).

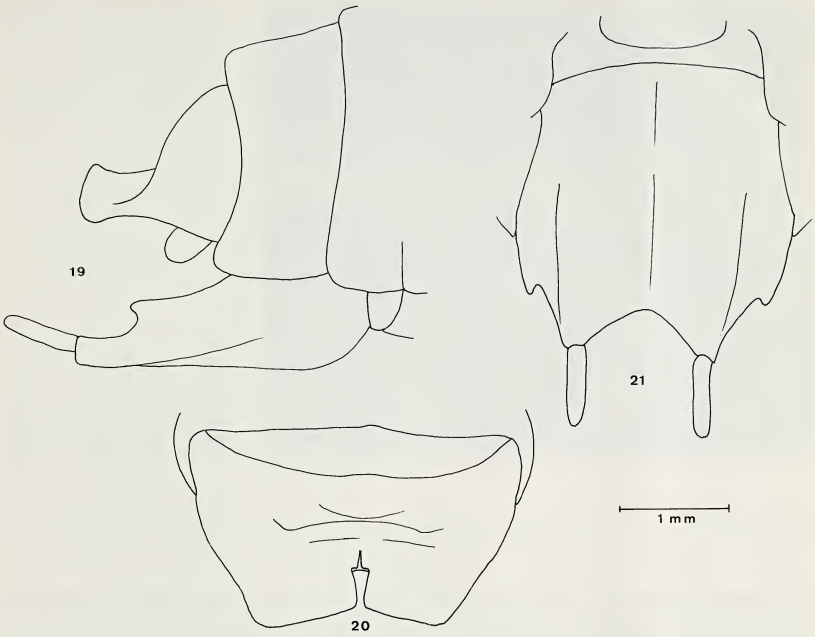
Description

Male (figs. 17-18). Size small. General appearance more slender than any other species of *Parnassiana*.

Thorax: pronotum slightly widening posteriorly; dorsum depressed, surface mat, metazona with low median keel; lateral pronotal lobes angularly inserted. Fore wings triangular, apically rounded, reaching hind margin of third to fourth tergite; stridulatory file of left fore wing shaped as in fig. 29, individual teeth of middle of file as in fig. 30; number of teeth about 140. Hind femur comparatively slender, about 3.4 times as long as pronotum.

Abdomen: somewhat flattened from above; distal tergites even depressed, with hind margin very slightly emarginate medially. Last abdominal tergite (figs. 19-20) broader than long, divided apically by a narrow median incision into a pair of broad lobes; apical part of lobes curved dorsally, hind margin transversely truncate, median angle about rectangular and depending on degree of shrinkage overlapping each other medially or not. Cercus (figs. 22-23) short, when flexed invisible from above being concealed by last tergite; almost cylindrical basally, impressed from above in apical third, apical part broad, inflated, finger-shaped; inner margin of cercus just distally of middle of length with a hook-shaped tooth, tip acute and pointing medioventrally. Subgenital plate (figs. 19 & 21) large, ventral surface with a low median and on either side a lateral keel, dorsolateral margin remarkably notched in its middle, hind margin broadly V-shaped incised; styles slender, long, six times as long as wide. Epiphallus (figs. 24-27) small, well sclerotized; basal part broad medially and anterior side strongly spinulose; apical part short, compressed laterally, straight, margins scarcely tapering apically and provided with a few hook-shaped spinules, very tip with one, two or three hook-shaped spinules.

Colouration: various shades of brown. Antennae brown, margins of first segments partly black. Head mottled dark and pale brown, a postocular and dorso-median yellowish or greenish stripe, often bordered black proximally. Dorsum of pronotum pale brown, yellowish or greenish with a pale weakly concave lateral stripe; lateral lobe dark brown, sometimes with black markings; lower margin broadly and hind margin narrowly bordered yellowish brown. Meso- and metathorax blackish brown with or without yellow spots in the middle. Fore wings and abdomen of

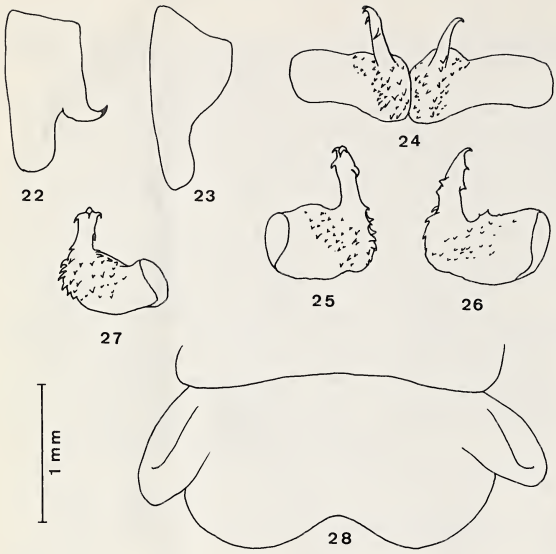


Figs. 19-21. *Platycleis* (*Parnassiana*) *tenuis* sp.n., paratypes; 19, lateral view of tip of male abdomen; 20, dorsal view of male last abdominal tergite; 21, ventral view of male subgenital plate.

general colour, lateral sides of proximal tergites partly dark brown or black. Legs of general colour, mottled; fore and mid legs with a few scattered black dots; hind femur with a small series of blackish transverse stripes basally on outer and upper sides and with a short longitudinal black stripe in upper half of outer and inner side halfway the length of femur.

Bio-acoustics (figs. 31-32): Calling song (20°-30 °C) consisting of a long series of echeme-sequences with repetition rate of commonly 23-33 per minute and variable intervals (0.5-5 s). Each echeme-sequence lasting for shorter to slightly longer than 1 s, rapidly increasing in loudness, ending abruptly, number of audible echemes variable but usually about 7-8. Duration of each echeme variable, measured values from 167-182 ms (air temp. 20 °C, 00.15 local time, dark), 122-127 ms (air temp. 22 °C, 11.00 local time, sun) and 102-109 ms (air temp. 30 °C, 22.30 local time, dark). Echeme repetition rate consequently also variable, ranging from about 6/s to almost 10/s. Each echeme composed of two syllables; each syllable consisting of a pair of hemisyllables as both opening and closing movements of fore wing produce sound; last hemisyllable referring to final closing of wing apparently longer than the other hemisyllables. Another sound with a "drum" character (fig. 32) may be produced during calling song. It exists of a short and rapid series (3-7) of short syllables, a "microsyllabic" echeme, that is produced and irregularly repeated during intervals between the "normal" longer ("macrosyllabic") echeme-sequences (Samways, 1976).

Female as male, slender. Fore wings reaching just beyond hind margin of first tergite, touch-



Figs. 22-28. *Platycleis* (*Parnassiana*) *tenuis* sp. n., paratypes. 22-23, left male cercus in dorsal (22) and lateral (23) view; 24-27, epiphallus in (24) anterior view, left (25) and right (26) part in lateral view and (27) right part of epiphallus of another male in lateral view; 28, ventral view of female subgenital plate.

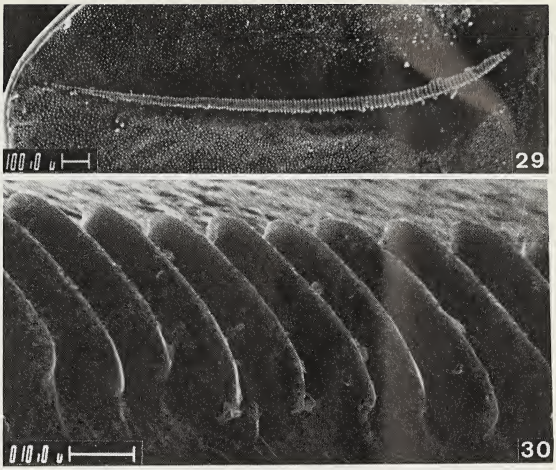
ing each other medially. Sternites not modified. Hind femur as slender as in male. Subgenital plate (fig. 28) twice as broad as long, ventral surface evenly convex, no median keel, hind margin broadly rounded with median emargination; lateral sclerites strong, well extending laterally, impressed anteriorly. Ovipositor slender, three times as long as pronotum, slightly and evenly upcurved, dorsal margin smooth, ventral margin finely serrate apically. Colouration as in male; sternites, subgenital plate and ovipositor yellowish brown.

Measurements (length in mm): body ♂ 14.1-16.3, ♀ 15.5-18.0; pronotum ♂ 3.1-3.2, ♀ 3.8-3.9; elytron ♂ 3.7-4.6, ♀ 2.6-2.7; hind femur ♂ 10.4-10.5, ♀ 13.0-13.2; ovipositor 10.8-11.6.

Differential diagnosis

The species is well defined and easily recognizable. According to habitat, song and most of the morphology the species fits the subgenus *Parnassiana* Zeuner, 1941 of *Platycleis* Fieber, 1852. Pronotum, colouration and most of the abdominal terminalia come near *Parnassiana tymphrestos* Zeuner, 1941 and *P. tymphiensis* Willemse, 1973. These species are characterized among the species of the subgenus by the depressed pronotal dorsum with matt surface, angularly inserted pronotal lateral lobes and truncate hind margin of the lobes of the male last abdominal tergite. The new species differs from the two species mentioned above, in much broader lobes of the male last tergite, apparently shorter male cercus, shorter and stronger spinulose epiphallus and in the broader and less emarginate female subgenital plate. Differences with other members of *Parnassiana* are greater. In these species the pronotal dorsum is flat or rounded with shiny surface, the pronotal lateral lobes are more roundly inserted, lobes of the male last abdominal tergite either rounded or pointed, male cercus and epiphallus otherwise shaped and the female subgenital plate less broad and deeper emerginated (compare Willemse, 1985b: 188-195, figs. 602-658).

Apart from these minor differences, however, the new species differs remarkably from

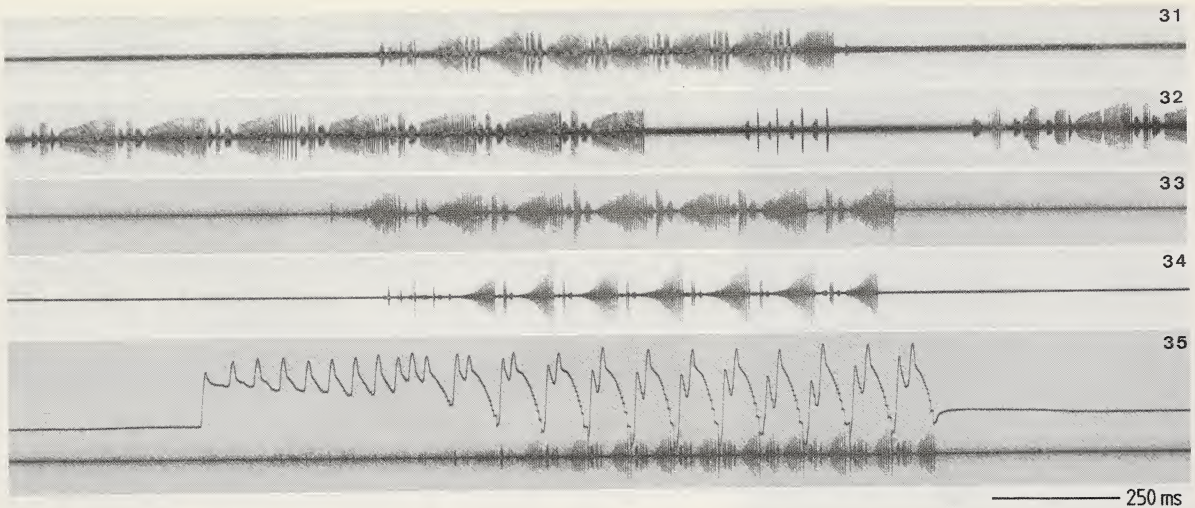


Figs. 29-30. *Platycleis* (*Parnassiana*) *tenuis* sp.n., paratype, stridulatory file of left male fore wing.

all other *Parnassiana* species in its more slender appearance, especially in the morphometrics of the hind femur. One of the diagnostic characters of *Parnassiana* is the short and thick-set hind femur: the proximal part is apparently swollen, the length of the attenuate distal part short and the length of the whole hind femur should not exceed three times the pronotal length. The hind femur of the new species, however, is more slender and comparatively longer, about 3.4 times as long as the pronotum. Another quite distinct and unique feture of the new species is shown by the dorsolateral margin of the male subgenital plate. This margin (fig. 19) is distinctly notched, a character as far as known to us not found in any other member of *Parnassiana* or *Platycleis* (s.l.). An additional distinct feature refers to the number of about 140 stridulatory teeth that not is reached by any other species of *Parnassiana*.

As shown in fig. 35 the movements of the fore wings in *Parnassiana* when producing each echeme, consist of an opening stroke, a short closing stroke, a further opening stroke to a more extreme position, and finally a long closing stroke to complete the echeme. All four strokes produce sound, so that there are four hemisyllables separated by short breaks in the sound. The figures show clearly that the hemisyllable referring to the complete closing of the fore wing is the longest and commonly the loudest part of the echeme. The alternating short and long syllables of the song in *Parnassiana* is quite characteristic and appears to be unique among European bushcrickets. The song pattern of *P.tenuis* is quite similar to that described above as typical for the subgenus and is therefore a strong argument that *tenuis* indeed belongs to *Parnassiana* (compare figs. 31-32 with figs. 33-35 and another four species in Heller, in press).

Mainly due to an appreciable degree of individual variation the songs of most *Parnassiana* species appear not clearly distinct from each other. An explanation could be that most of the members of this subgenus occur allopatric. In Mt.Tzoumerka, however, apart from *P. tenuis* another species of *Parnassiana* has been found, at the same spots and commonly even in the same shrub, very close together. The second species comes near *P. panaetolikon* Willemse, 1980, but the outer surface of the apical parts of the epiphallus is completely smooth or almost so, while in typical *P. panaetolikon* this surface is spinulose. Definite iden-



Figs. 31-34. *Platycleis* (*Parnassiana*) species, oscillograms of male calling songs. 31, *tenuis* sp.n., paratype, collected 24.vii. & recorded 3.viii.1987, air temp. 22 °C, 11.30 h local time, sun; 32, *tenuis* sp.n., paratype, collected 17-18.viii. & recorded 26.viii.1988, air temp. 20 °C, 22.30 h local time, dark; 33, *tymphiensis*, Greece, Ioannina, Mt.Smolikas above Samarina, 26.vii.1978, K.-G. Heller, air temp. 20 °C; 34, *nigromarginata* Willemse & Willemse, 1987, paratype, collected 9-10.vii. & recorded 30.vii.1986, air temp. 26 °C.

Fig. 35. *Platycleis* (*Parnassiana*) *tymphrestos*, synchronous registration of left fore wing movement (upward = opening, downward = closing of wing) and calling song of a male, Greece, Fthiotis, Mt.Oiti, 10.vii.1986, K.-G. Heller, air temp. 25 °C.

tification is postponed and preliminarily we name the species *P. panaetolikon*-like. This syntopic occurrence of two *Parnassiana* species offered an opportunity to find out whether their songs are different or not. As far as observed the songs produced by the males of each species when within each other's earshot were similar to their songs when isolated. The songs of both species, indeed, differ consistently in our sample studied. The *panaetolikon*-like species produces a slightly larger number of echemes per sequence (10-15 against commonly 7-8 in *tenuis*) but presents especially an apparently lower repetition rate of the echeme-sequences (6-12 per minute against 23-33 in *tenuis*). However, the individual variation observed in another member of the subgenus, *tymphrestos*, overlaps these differences (Heller, in press). Another difference between *tenuis* and the *panaetolikon*-like species refers to the short "microsyllabic" echemes. This sound, a quite common feature among other members of the subgenus, is usually associated with the beginning or end of a "normal" echeme-sequence. In *tenuis* this sound is less often produced and not clearly associated with the "normal" echeme-sequences but in the studied males of the *panaetolikon*-like species this sound has not been produced at all.

Distribution and habitat

Known only from the high areas (1400-1800 m) of Mt.Tzoumerka (Ipiros), a 2395 m high mountain of the central Pindhos range, northeast of Arta. The type-locality are the slopes of the southeastern summit of this mountain complex, called Spilia, located south of the mountain village Theodhoriana. The northern slopes of this summit can be reached via the mainroad between the villages of Athamanio and Theodhoriana and having crossed just the pass (1000 m) by following a track at your left. After a few kilometers a spring is reached at 1200 m altitude. The species was found above and left of this spring at 1400 m. The southwestern slopes of the summit can be visited via a mountain road that branches off the mainroad some 3 km west of the village of Voulgareli (formerly named Drosopiyi). Here a more dense population than on the northern slopes was found at 1700 m. At both localities *P. tenuis* and the *panaetolikon*-like *Platycleis* species occur together, the latter more numerous on the southern slopes above Voulgareli. The habitat consists of rocky slopes above the timberline covered by low and dense vegetation of various herbs and grasses. The populations are quite local, specimens were not numerous and most of them not yet adult at the end of July.

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