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Rhacocleis Fieber 1853 and *Pterolepis* Rambur 1838, distinct species groups or not ?

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Abstract

Results are presented of a study on the armature of the hind and fore tibiae in 39 species and 4 additional subspecies, out of 54 (formally recognised) species and 9 additional subspecies, belonging to *Rhacocleis* and *Pterolepis*. The armature of the hind tibia, traditionally used to separate *Pterolepis* and *Rhacocleis*, varies within taxa from very slight in most taxa to extensive in a few. The armature of the upper inner margin of the fore tibia proved a more reliable character than the traditional hind tibial armature to separate *Pterolepis* and *Rhacocleis*, indicating that the synonymy of *Rhacocleis* with *Pterolepis* proposed in Heller *et al.* (1998), should be re-evaluated. Observations suggest a possible re-arrangement of species described under *Pterolepis* and *Rhacocleis*, but no nomenclatural changes are proposed. It is argued that nomenclatural changes, if any, should only be taken after a much needed review of the generic definitions in the Platycleidini (*s.l.*). An updated checklist of *Pterolepis* and *Rhacocleis* taxa is included. *Pterolepis ramburi* Serville 1838 is proposed as a *species incertae sedis*.

Key words

Tettigoniinae, Platycleidini, *Rhacocleis*, *Pterolepis*, morphological distinction, systematics

Introduction

From the beginning the name *Pterolepis* has been misinterpreted, causing much nomenclatorial confusion. Rambur described *Pterolepis spoliata gen.* and *sp.n.* in his survey of the entomological fauna of Andalusia, southern Spain. Rambur's publication on the Orthoptera was issued partly in 1838 (pp. 1-16) and partly in 1839 (pp 17-94), the latter including the description of *Pterolepis* (p. 59). In that description it is clearly stated that the prosternum bears 2 spines: "prothorax ayant, en dessous, deux petites pointes et une autre en dessus à ses hanches". In a footnote, Rambur mentions having before him a second member of his genus, "*Corsica*" *in litt.*, that he then had delivered to Serville for further description (no doubt because its locality Corsica was outside the scope of his Andalusian fauna).

Serville's (more correctly Audinet-Serville's) work on Orthoptera was published in 1839 (some claim 1838), the same year as Rambur's paper. Serville incorrectly described and arranged the genus *Pterolepis* (the author's name correctly assigned to 'Rambur in Andalusian Fauna') under the genera with an unarmed prosternum, representing members of Pholidopterini (and possibly one member of *Antaxius* Brunner 1882). At the same time, Serville erected the genus *Thyreonotus* for Rambur's species *corsicus* (*in litt.*) because of its spined prosternum (and thus correctly distinct from his (Serville's) *Pterolepis* (=*Pholidoptera* Wesmael 1838, *partim*). Rambur's species *spoliata* is not mentioned in Serville's work. Apparently the text of Rambur's paper had not reached Serville in time to incorporate it in his major contribution.

Thus, from the very beginning (1839), there were 2 versions of the name *Pterolepis*, the original one of Rambur—with spined prosternum—and the misinterpretation in Serville—with unarmed prosternum.

Fieber (1853/1854), in his 'Synopsis', followed Serville's interpretation of *Pterolepis* and erected *Rhacocleis* for 2 new species with a spined prosternum: *annulatus* and *discrepans* (= *germanica* Herrich-Schaeffer). Fieber grouped his new genus with *Thyreonotus*. Though he didn't indicate the distinction he drew between *Rhacocleis* and *Thyreonotus*, it was most likely based upon their different meso- and metasterna and male cerci. The meso- and metasternum are acutely pointed in *Thyreonotus* (in agreement with Serville's description: "Présternum fortement bidenté, *ainsi que le mésosternum et le métasternum* [in italics]") against simple triangular lobes (Fieber' s *Rhacocleis*: "Mittel- und Hinterbrustlappen dreieckig"). The male cercus in *Thyreonotus* is wide and flattened medially, without basal tooth, but in *Rhacocleis*, quoting Fieber: "Raife des Mannes pfriemlich, am Grunde ein Dorn". Either Rambur's original description of *Pterolepis* was not available to Fieber or misinterpreted by him, because he arranged Rambur's *spoliata* under Serville's *Pterolepis* species with unarmed prosternum.

Fieber's study was issued in the same year as Fischer's 'Orthoptera Europaea'(1853). Fischer, however, recognized Serville's confusion, erecting his genus *Thamnotrizon* (=*Pholidoptera*) for Serville's *Pterolepis*, and arranged under *Pterolepis* Rambur's *spoliata*, as well as Herrich-Schaeffer's *germanica* (1840, as *Decticus*), his *modesta* (=*germanica*) but also *pedestris* (Fabricius 1787) and his *spinibrachius* (both now *Antaxius*). So it happened again that 2 important papers were published almost simultaneously, resulting in confusion mainly by Fieber's misinterpretation of Serville's *Pterolepis*.

Herman (1874) again stressed the importance of the distinction between unarmed and bispinose prosterna and grouped *Rhacocleis*, *Thyreonotus*, *Pterolepis* and other genera with armed prosternum versus *Decticus* Burmeister 1838, *Thamnotrizon* (=*Pholidoptera*) and other genera with unarmed prosternum. However, Herman distinguished *Pterolepis* from *Rhacocleis* using the length of the plantulae, as did Fischer for a subgroup of *Pterolepis* (*sensu* Fischer). As a result, Herman's *Pterolepis* refers to what is now arranged under *Antaxius*.

Within the group of genera with a bispinose prosternum, Brunner von Wattenwyl (1882) distinguished *Pterolepis* from *Rhacocleis* on the number of spurs at the tip of the hind tibiae, grouping among

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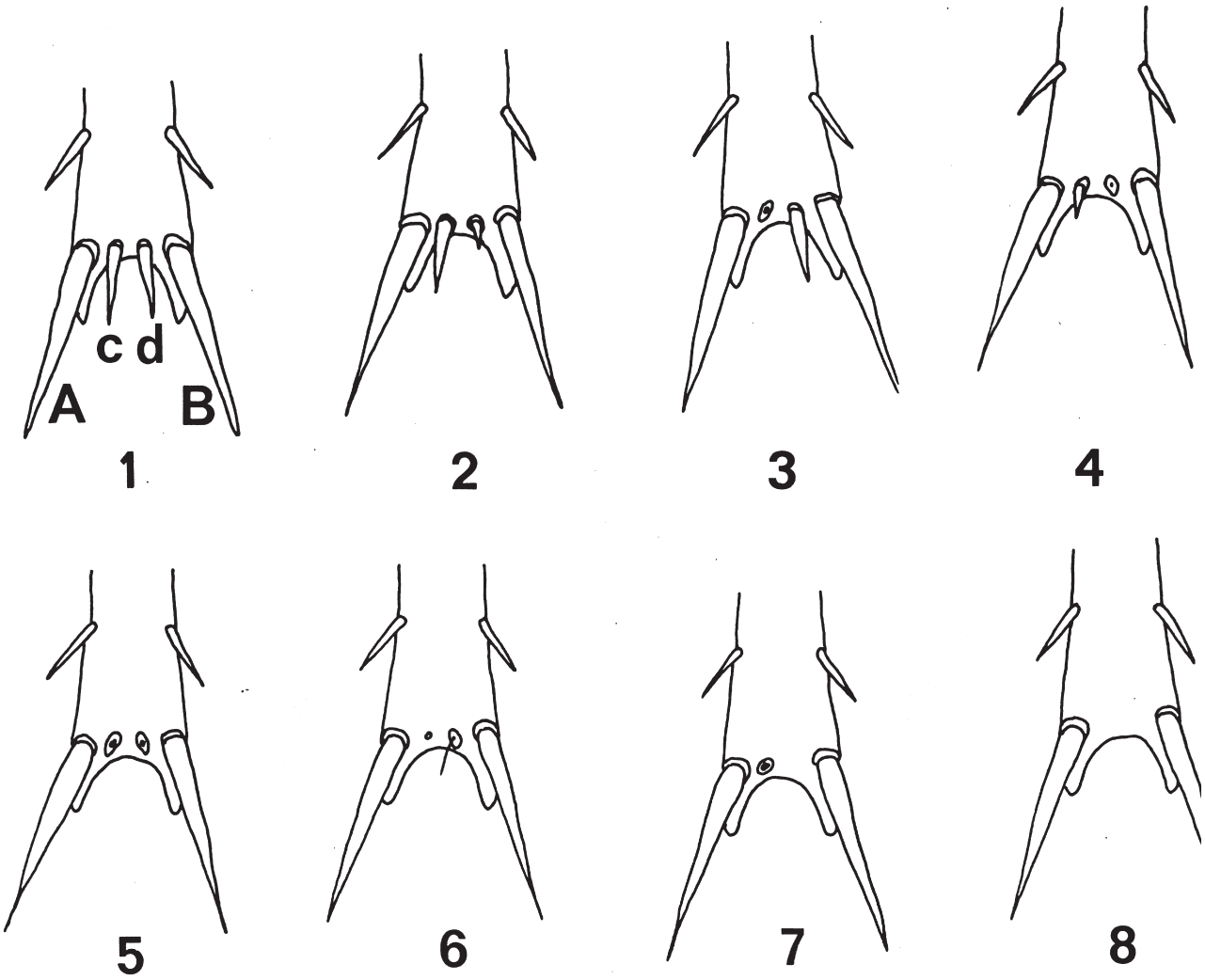


Fig 1. Schematic draft of the ventral side of the tip of the hind tibia in *Pterolepis* Rambur 1839 and *Rhacocleis* Fieber 1853, showing transitional forms (2-4) between what might be called (1) 'typical' *Pterolepis* with four spurs (A & B = pair of outer spurs and c & d = pair of inner spurs) and (5-8) 'typical' *Rhacocleis* with 2 spurs (A & B only, c & d lacking).

other genera, *Drymadusa* Stein 1860, *Gampsocleis* Fieber 1852 and *Pterolepis* with 4 spurs, against *Rhacocleis*, *Thyreonotus*. and *Antaxius* with 2 spurs. A further subdivision of both groups was based on the length of the plantulae: short in *Drymadusa*, long in *Gampsocleis*/*Pterolepis* and short in *Thyreonotus* and *Antaxius* and long in *Rhacocleis*. This arrangement, with a number of additions and modifications, has been followed since in Brunner (1893), Kirby (1906), Caudell (1908), Harz (1969) and up to the present time.

Besides the obvious nomenclatorial confusion, a close examination of references dealing with the systematics of *Pterolepis* versus *Rhacocleis*, shows that the number of ventral spurs at the tip of the hind tibia has always been the traditional key character to distinguish *Pterolepis* from *Rhacocleis*. Uvarov (1942: 315-316), while describing *R. graeca* Uvarov 1942, noticed that the hind tibiae in all males had outer spurs but no inner spurs; whereas in the female type specimen, one hind tibia showed an under-developed inner spur, the other one lacking such a spur. He remarks that his new species might be referred to *Pterolepis* Rambur 1839, which differs from *Rhacocleis* in this particular character, *i.e.*, presenting not only outer spurs but also inner spurs (although shorter than the large outer spurs). Quoting his words: "The importance of this character appears somewhat uncertain, although it is used to separate not only genera of Decticinae, but even larger groups".

Likewise in some North African species assigned to *Rhacocleis* (*silviarum* Galvagni 1984; *moralesi* and *adolphorum*, both Galvagni 1988; *pieltaini* Morales Agacino 1940 and (?) *maroccana* Bolívar 1905), the tip of the hind tibia presents individually a single or 2 inner spurs, commonly unilateral and much reduced in size, or only a pair of sockets or pits without any spur. These aberrant armatures have been described, figured and discussed in Galvagni (1984: 90, fig. 8-9; 1988: 43, 62, 67, fig.16), who assumes that these are anomalous exceptions that probably do not undermine the reliability of the key character between *Pterolepis* and *Rhacocleis*.

Heller (1988) remarks that the habitus of *Rhacocleis*, particularly of *graeca*, closely resembles that of *Pterolepis*. He noticed that the armature of the tip of the hind tibia is variable, both in *Rhacocleis* and *Pterolepis*, pointing out that this character is not always reliable as a generic key character. Heller (1988) then emphasised that if no other distinctive character between *Pterolepis* and *Rhacocleis* can be found, it is necessary to synonymise these genera. When compiling a checklist of European Orthoptera, Heller *et al.* (1998) stressed again the lack of distinct features between the genera and

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consequently listed all European species formerly arranged under *Rhacocleis* under *Pterolepis* (its senior synonym).

In the process of dealing with the generic assignment for 2 recently discovered tettigonid species (Willemse & Willemse, this issue), the distinction between *Pterolepis* and *Rhacocleis* has been re-evaluated. Particulars of the armature of the legs of more than 1000 specimens, representing 43 taxa (out of about 63 presently recognized formal taxa, including subspecies) were studied by the present authors and the following orthopterists: B. Çiplak, P. Fontana, A. Galvagni, K.-G. Heller, R. Kleukers and J. Tilmans (Tables 1, 2).

Armature of the hind tibiae

Two pairs of spurs occur on the lower (ventral) side of the tip of the hind tibia: 1) a pair of long spurs located, one on the outer, one on the inner side, and commonly named the 'outer apical spurs' (Fig.1, A, B) and 2) an additional pair of much shorter ones, located in between the others, commonly named the inner apical spurs (Fig.1, c, d). Within *Pterolepis*/*Rhacocleis* is found a full range—from well-developed inner spurs (though never as strong as the outer spurs) to rudimentary sockets with a hair or without any projecting structure, to the complete absence of even such rudimentary sockets (Fig. 1: 1-8).

Well-developed inner spurs at the tip of the hind tibia are considered typical for *Pterolepis*, while absence of these spurs is considered typical for *Rhacocleis* (though sockets may be present, even one bearing a hair, but with any true spur absent). Indeed, this situation fits the few available specimens of the type species of both genera, *Rhacocleis annulata* Fieber 1853 and *Pterolepis spoliata* Rambur 1838. However, in a few individuals of some subspecific taxa of the latter, the inner spurs are reduced in size and even lacking. Likewise some variation is found among members of *Rhacocleis*. The observation that a complete absence of inner spurs in *Rhacocleis* is not always true, as noted in Uvarov (1942), Galvagni (1984, 1988) and Heller (1988), could be confirmed. Within *Pterolepis* and *Rhacocleis* the number of apical spurs of the hind tibia varies, not only between conspecific specimens, but even unilaterally within a single specimen. While in *Pterolepis* it's quite exceptional that the inner spurs are reduced or lacking, in *Rhacocleis* the variation is more remarkable. In some populations of *R. germanica* 1 or 2 inner spurs are present in almost half the studied specimens. The results of our observations are given in Table 1, column E.

Armature of the fore tibiae

The armature of the upper outer ("posterior") margin of the fore tibia (Fig. 2), especially presence or absence of an outer apical spur, has been used extensively in traditional classification, even to discriminate between subfamilies and tribes. This margin commonly shows a spur at the distal end of the tympanal opening, 1, 2, or exceptionally 3, on the mid part, and one apical spur on the tip. This armature is found in both *Pterolepis* and *Rhacocleis*, as well as in most other examined genera of the Platycleidini (*s.l.*) [not defined in Harz (1969) or *c.f.* Otte *et al.* (2004), but in Zeuner (1941), and redefined in a much broader sense in Rentz & Colless (1990) and followed in Otte *ex aff.* (2004)].

The armature of the upper inner ("anterior") margin of the fore tibia received less attention in this group of species. Exceptions, where the armature of the inner margin of the fore tibiae is mentioned, are Bolívar (1899), differentiating his *Scirtobaenus lusitanicus* (now *Rhacocleis*) from Pantel's *grallatus* (now *Pterolepis spoliata grallata*), a remark in Uvarov (1942), one of the 82 characters used for a numerical analysis in Rentz & Colles (1990) and comments in Çiplak (2000). Uvarov (1942) remarks that in *R. silvestrii* (cited as *uvarovi*, see also Ramme (1951) and Willemse (1982)) the armature of the front tibia bears spines on its upper side, 3 external, and 1 internal, "while in all other species of the genus the numbers are four and two, respectively. It is probable that these differences are of generic value, but it appears wiser to refrain from erecting a new genus until the numerous species of *Rhacocleis* are better known".

Results of the present study are given in Table 2 (column E) and indicate that *Pterolepis* and *Rhacocleis* not only differ in the armature of the fore tibia, but also that this character is less variable than the armature at the apex of the hind tibia. The studied material shows that in all taxa assigned to *Pterolepis*, the upper inner margin of the fore tibia invariably is unarmed, as in most Platycleidini (*s.l.*).

In *Rhacocleis*, however, the situation is more complicated. The upper inner margin in most species, including the type species, presents 1 to 3 spurs, a basal one at the distal end of the tympanal opening, one halfway on the length and sometimes a third distal spur (Fig. 2). In *Rhacocleis* species from northwestern Africa, as far as examined, this margin is unarmed as in *Pterolepis* (with exception of one specimen of *augustini* Galvagni 2001 that unilaterally bears a single spur). A bilaterally unarmed upper inner margin is found also in about half the specimens of *R. poneli* Harz & Voisin 1987 from southeastern France and in 1 to 2% of *neglecta* (Costa 1863) from Italy. In all other species assigned to *Rhacocleis*, as far as studied, this margin may also be unarmed, but if so then not bilaterally, only unilaterally. This situation was seen in *R. grisea* Baccetti 1991 from Sardinia, *insularis* Ramme 1928 from the Aegean islands and *derrai* Harz 1983 from Crete.

Discussion

The general range of *Pterolepis* and *Rhacocleis* surrounds the Mediterranean, reaching roughly from the Iberian peninsula and opposing northwest Africa, eastward along Mediterranean northern Africa, via Israel to Anatolia, then back west to the Balkans, (extending north and east) and to Italy and south France, and including many Mediterranean islands. Though our observations of numbers of specimens and taxa are only extensive, not exhaustive, they suggest a correlation between the armature of the upper inner margin of the fore tibia and this geographical distribution (Table 2). One can recognise 2 groups: 1) taxa with this margin unarmed and 2) those presenting at least one spur unilaterally (average 0.5 spurs per tibia).

The geographical range of Group 1 covers the southern Iberian Peninsula, the islands of Sardinia and Sicily, and extends from northwestern Africa to Libya, including Egypt (?) (*R. bidens* Uvarov). That of Group 2 reaches from Israel (?) (*R. ayali* Karabag), through Anatolia, via the Aegean islands and the Balkans to Italy, including Sicily, Sardinia and Corsica, reaching southeastern France and the Iberian species *R. lusitanica*.

The first group contains all species described under *Pterolepis*, including its type species *P. spoliata*, the Iberian *grallata* Pantel 1886 (described under *Scirtobaenus*), the species from Sardinia and Sicily described under *Pterolepis*, probably the northwestern African species *Pterolepis theryana* Uvarov 1927 (not studied), but also, as far as studied, all African species assigned to *Rhacocleis* (a large number, see Table 1, 2, columns A, B).

The second group fits the type species of *Rhacocleis*, *R. annulata* and all taxa, as far as studied, described under *Rhacocleis* and ranging

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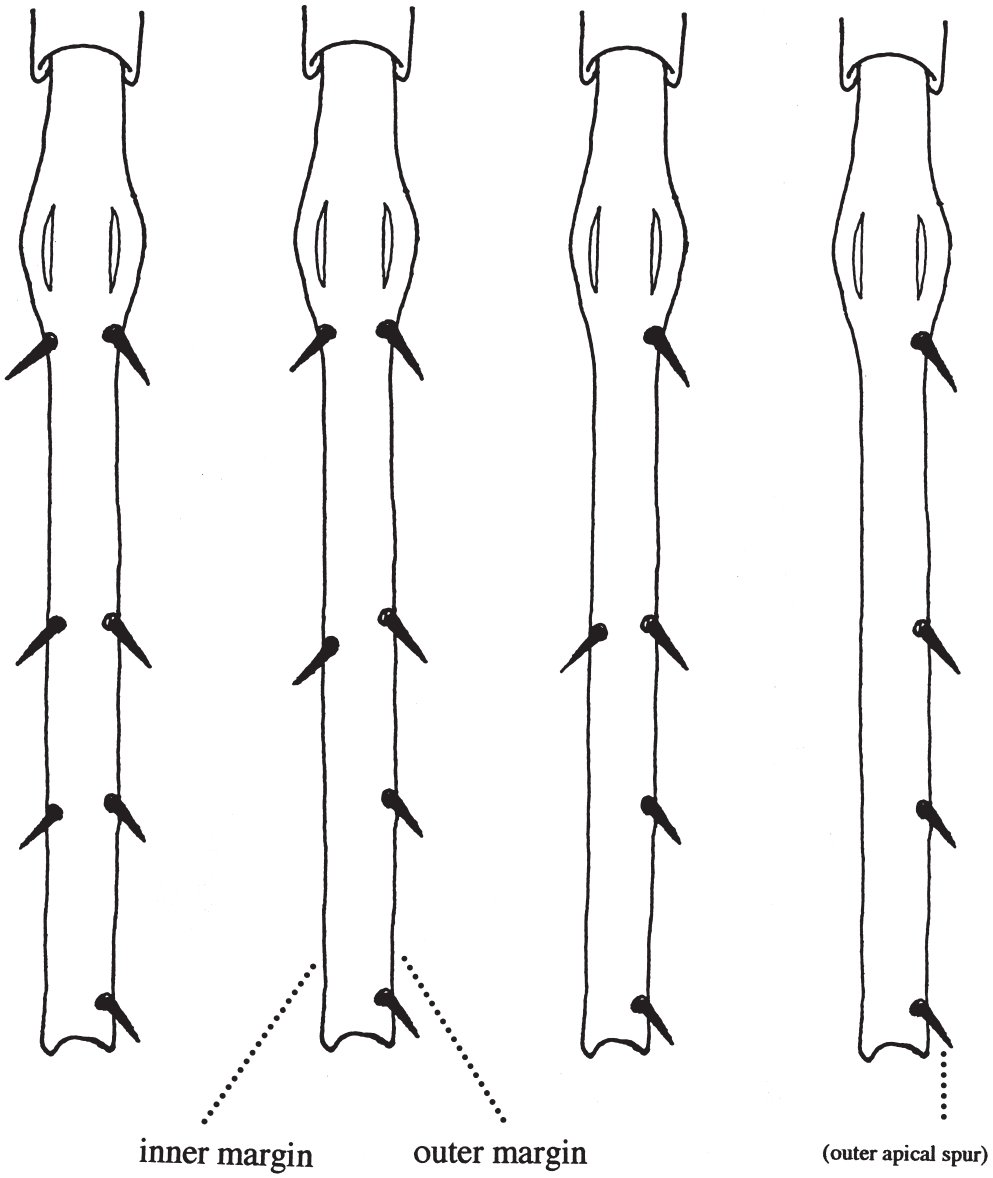


Fig. 2. Schematic draft of the upper side of the fore tibia in *Pterolepis* Rambur 1839 and *Rhacocleis* Fieber 1853, showing the inner margin ranging from unarmed to armed with 3 spurs. The most distal spur of the outer margin is the apical spur often used in traditional classification.

from Israel (?) (*R. ayali* not studied), through Anatolia, the Aegean and the Balkans, Italy, the islands of Sardinia, Sicily and Corsica, reaching southern France and part of Iberia.

Apparently members of both groups occur in Sardinia and Sicily: :*Rhacocleis grisea* and *R. minerva*, both Baccetti 1991, with *Pterolepis pedata* (Costa 1882); *Rhacocleis annulata* Fieber 1853 with *Pterolepis elymica* Galvagni & Massa 1980 (*R. berberica dubronyi* Baccetti *ex aff.*. 1995 not studied).

The position of *R. poneli* is interesting. The upper inner margin of the fore tibia is either bilaterally or unilaterally armed with a single spur; but in about half the studied specimens it is bilaterally unarmed; among our studied material this is an exceptionally poorly developed armature. In combination with this species' occurrence in southern France, this is noteworthy because it bridges the unarmed condition in Iberian species assigned to *Pterolepis*, with the armed one in Italian and eastern European species arranged under *Rhacocleis*.

Conclusion

Without doubt *Pterolepis* and *Rhacocleis* are closely related species groups. The armature of the apex of the hind tibia in *Pterolepis* and *Rhacocleis* varies within taxa from not armed or very slightly so in most, to considerably armed as in, *e.g.*, *R. germanica*. The armature of the upper inner margin of the fore tibia appears to be a more stable character than that of the tip of the hind tibia.

The present observations are suggestive of a re-arrangement of the species described under *Pterolepis* and *Rhacocleis*, either as species groups, subgenera or genera (Table 2, column F). However, in the interest of stability of nomenclature, we propose for the time being, to continue the current classification as given in Otte (1997), Naskrecki & Otte (1999) and Otte *ex aff.* (2004) (Table 1, 2, column A).

A re-evaluation of the status of taxa arranged under *Pterolepis*/*Rhacocleis* should not only be based on more material, but include as well nonmorphological characters. And ideally, it should be carried out in conjunction with a wider and much needed critical review

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of the generic definitions in the Platycleidini (*s.l.*). It is emphasised that the presence of one or more spurs at the upper inner margin of the fore tibia, as observed in a number of species presently arranged under *Rhacocleis*, is quite exceptional among Platycleidini (*s.l.*), particularly among palaearctic members of this tribe. Further analysis would be most welcome.

Checklist of taxa recognized in *Pterolepis* Rambur 1838 and *Rhacocleis* Fieber 1853

An updated checklist of taxa presently recognized in *Pterolepis* and *Rhacocleis* is presented in column A of Table 1 and 2, together with their approximate distribution (B) and the armature of the ventral side of the apex of the hind tibia (column E of Table 1) and of the upper inner margin of the fore tibia (column E of Table 2), as far as examined in this study. This checklist deviates considerably from those in Otte (1997) and Naskrecki & Otte (1999), but is only slightly at odds with a recent version of the Orthoptera Species File Online (Otte D. *et al.*, version 15 January 2005).

Alterations to the latter are as follows: *Rhacocleis silviarum* Galvagni 1984, *R. lagrecai* Fontana & Massa 2004, *R. andikithyriensis* Tilmans [in press] and *Pterolepis spoliata raggei* Galvagni 1981 [not synonymised in Heller (1988)] are added; *R. neglecta corsicana* Bonfils 1960 is given species status in Galvagni (1976); some corrections refer to *Pterolepis spoliata llorenteae* [Galvagni (1981), *nec llorente*], *Rhacocleis annulata* [*nec annulatus*, gender of *Rhacocleis* feminine], *R. silvestrii* [Ramme (1939;1951), *nec sylvestrii*], *R. tyrrhenica* [La Greca (1952), *nec thyrrhenica*] and *R. werneri* Willemse [Willemse (1982), nec Hong].

Rhacocleis ramburi (Serville 1838) was described under *Pterolepis* together with 3 other species: the first representing *Eupholidoptera chabrieri* (Charpentier 1825), the second *ramburi*, *sp.n.*, described after a female from southern France, the third *Pholidoptera griseoaptera* (DeGeer 1773) and the last as *armillata sp.n.*, probably representing an *Antaxius* species.

The identity of *Pterolepis ramburi* has always been obscure. Brunner v.Wattenwyl assigned it doubtfully under *Pholidoptera aptera* (Fabricius) (Brunner 1861: 297, as *Thamnotrizon*) and later under *Rhacocleis neglecta* (Costa) (Brunner 1882: 323, as *Rhacocleis bormansi sp.n.*). Also Bolívar (1899: 153) arranged Serville's species doubtfully under *Antaxius pedestris* (Fabricius), including Seoane's (1877) record of *Thamnotrizon ramburi* Serville from the Pyrenees. Finot in his Faune de la France (1890) even omitted Serville's taxon. Both Kirby, in his Synonymic Catalogue II (1906: 187) and Caudell, in his decticine part of the Genera Insectorum (1908: 5) listed *Pterolepis ramburi* Serville under *Rhacocleis* without further comments. Since these publications, records of this taxon have not been found, including Chopard (1951) and Harz (1969). Though from the description and context, *Pterolepis ramburi* might represent *Pholidoptera femorata* (Fieber 1853) (or *Pholidoptera aptera* (Fabricius 1793) or *Rhacocleis poneli*, *cf.* coloration hind femur, but improbable because of spined prosternum), its identity will stay uncertain as the type is lost. Because the name of *P. ramburi* seems to have never been used again in almost a century, and because the type is unknown and its identity obscure, we propose *Pterolepis ramburi* Serville 1838 as a *species incertae sedis*: we omitted it from our checklist.

In Otte *et al.* (2004) citation on the synonymy of *Scirtobaenus* is incomplete. Uvarov (1930) described *Scirtobaenus turcicus* but, agreeing with Ramme's opinion, Uvarov transferred his species to *Rhacocleis* some years later (1934: 58), pointing out as "SYN.NOV." that *Scirtobaenus* is just a junior synonym of *Rhacocleis*. In Harz (1969) *Scirtobaenus* is included in *Rhacocleis* (both *grallata* and Bolivar's *lusitanicus*) but the citation of this synonymy is lacking. The type species of *Scirtobaenus* is *grallata* Pantel 1886 (originally monotypic). Heller (1988) transferred *grallata*, arranged under *Rhacocleis* in Harz (1969), to *Pterolepis* as a subspecies of *P. spoliata*, unaware that by this action *Scirtobaenus* became again a synonym, but now of *Pterolepis*. These circumstances may also explain why the second species of *Scirtobaenus*, *S. lusitanicus* Bolivar 1899 can be found under *Rhacocleis*, with *grallata* under *Pterolepis*.

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Table I. Checklist of taxa of *Pterolepis* Rambur 1839 and *Rhacocleis* Fieber 1853. Columns: A, traditionally classified under these genera, based on the number of ventral inner spurs of the apex of the hind tibia (spurs c & d, as in 1-4 of Fig.1); B, approximate distribution; C, number (n) of studied specimens; D, depositories of studied material (abbreviated as: C (B. Çiplak), F (P. Fontana), G (A. Galvagni), H (Kl.-G. Heller), K (R. Kleukers), T (J. Tilmans), W (Willemse) or other source of information; E, minimum and maximum number of observed ventral inner spurs of the tip of the hind tibia and their average number per hind tibia.

Column A	B	C	D	E	
				Number of ventral inner spurs at tip of hind tibia	
TAXA	Approximate distribution	n	Depository or reference	Minimum & maximum of left and right hind tibia	Average number of spurs, unilateral
PTEROLEPIS type species *Pterolepis spoliata* Rambur 1838					
spoliata spoliata Rambur 1838	Spain	2	H	2-2 → 2-2	2.00
spoliata minor Bolivar 1899	Spain	0		?	?
spoliata kaltenbachi Galvagani 1981	Portugal	0		?	?
spoliata llorenteae Galvagni 1961	Spain	0		?	?
spoliata nadigi Galvagni 1981	Spain	5	G; H	0-0 → 2-2	1.11
spoliata nevadensis Galvagni 1981	Spain	6	G; H	0-0 → 2-2	1.33
spoliata pascuali Galvagni 1981	Spain	0		?	?
spoliata raggei Galvagni 1981	Spain	0		?	?
spoliata grallata (Pantel 1886)	Spain	±5	H; Pantel 1886; Bolivar 1899	0-0 → 2-2	1.90 (±)
spoliata ssp.?	Spain	3	H	2-2 → 2-2	2.00
spoliata ssp. ?	Spain	21	W	1-2 → 2-2	1.95
cordubensis Bolivar 1900	Spain	0		?	?
pedata Costa 1882	Sardinia	63	G; K	2-2 → 2-2	2.00
elymica Galvagni & Massa 1980	Sicily	8	G	2-2 → 2-2	2.00
gessardi Bonnet 1886	Tunisia, Algeria	2	G	2-2 → 2-2	2.00
theryana Uvarov 1927	Morocco	0		?	?
RHACOCLEIS type species *Rhacocleis annulata* Fieber 1853					
maroccana Bolivar 1905	Morocco	3	G	0-0 → 0-0	0.00
pieltaini Morales Agacino 1940	Morocco	11	G; Galvagni 1988	0-0 → 1-2	0.21
claudiae Galvagni 1988	Morocco	14	G; Galvagni 1988	0-0 → 0-0	0.00
adolphorum Galvagni 1988	Morocco	8	G; Galvagni 1988	0-0 → 2-2	0.20
moralesi Galvagni 1988	Morocco	11	G; Galvagni 1988	0-0 → 1-2	0.78
berberica berberica Galvagni 1989	Algeria	0		?	?
berberica dubronyi Baccetti e.al. 1995	Sicily	0		?	?
korsakovi Uvarov 1942	Algeria	0		?	?
kabylica Galvagni & Fontana 2000	Algeria	1	F	0-0	0.00
silviarum Galvagni 1984	Algeria	10	G; Galvagni 1984	0-0 → 0-1	0.03
algerica Uvarov 1935	Algeria	0		?	?
augustini Galvagni 2001	Algeria	3	G; W	0-0 → 0-0	0.00
galitana Uvarov 1942	Tunisia	0		?	?
maura Bonnet1886	Tunisia	0		?	?
lagrecai Fontana & Massa 2004	Libya	2	F	0-0 → 0-0	0.00
dernensis Salfi 1926	Libya	1	Salfi 1926	0-0	0.00
bidens Uvarov 1924	Egypt	0		?	?
ayali Karabag 1974	Israel	0		?	?
tuberculata Karabag 1978	Anatolia	0		?	?
turcica (Uvarov 1930)	Anatolia	10	C; W	0-0 → 0-0	0.00
acutangula Karabag 1957	Anatolia	0		?	?
anatolica Werner 1933	Aegean, Anatolia	8	W	0-0 → 0-0	0.00
agiostratica Werner 1937	Aegean	0		?	?
uvarovi Ramme 1939	Aegean	0		?	?
silvestrii Ramme 1939	Aegean	0		?	?
distinguenda Werner 1934	Aegean	5	W	0-0 → 0-0	0.00
insularis Ramme 1928	Aegean	18	H; W	0-0 → 0-0	0.00

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derrai Harz 1983	Greece	4	H	0-0 → 0-0	0.00
andikithiriensis Tilmans (forthcoming)	Greece	1	T	0-0	0.00
lithoscirtetes sp.n.	Greece	44	H; W	0-0 → 0-0	0.00
crypta sp.n.	Greece	18	H, W	0-0 → 0-1	0.07
werneri F.Willemse 1982	Greece	44	H;W	0-0 → 0-1	0.00
graeca Uvarov 1942	Greece	26	H; W	0-0 → 1-1	0.06
trilobata La Greca & Messina 1974	Greece	5	F; W	0-0 → 0-0	0.00
edentata F.Willemse 1982	Greece	35	H; W	0-0 → 0-0	0.00
ferdinandi L.Willemse &Tilmans 1986	Greece	12	H; W	0-0 → 0-2	0.08
bucchichi Hermann 1874	Dalmatia	6	H; K	0-0 → 0-0	0.00
neglecta (Costa 1863)	Italy	99	G; H; W	0-0 → 0-1	0.10
annulata Fieber 1853	Sicily	6	W; K	0-0 → 0-0	0.00
japygia La Greca 1957	Italy	1	W	0-0	0.00
tyrrhenica La Greca 1952	Italy	5	F; H	0-0 → 0-0	0.00
grisea Baccetti 1991	Sardinia	2	F	0-0 → 0-0	0.00
minerva Baccetti 1991	Sardinia	1	F	0-0	0.00
baccettii Galvagni 1976	Sardinia	0		?	?
bonfilsi Galvagni 1976	Corsica	0		?	?
corsicana Bonfils 1960	Corsica	1	F	0-0	0.00
germanica (Herrich-Schaeffer 1840)	France -NW Turkey	>500	H; K;T; W	0-0 → 2-2	0.64
poneli Harz & Voisin 1987	France	4	W	0-0 → 0-0	0.00
lusitanica (Bolivar1899)	Portugal	0		?	?

Table 2. Checklist of presently recognised taxa of *Pterolepis* Rambur 1839 and *Rhacocleis* Fieber 1853 (Otte *et.al.* 2004). Columns: A, traditionally classified; B, approximate distribution; C, number (n) of studied specimens; D, depositories of studied material (abbreviated as: C (B. Çiplak), F (P. Fontana), G (A. Galvagni), H (Kl.-G. Heller), K (R. Kleukers), T (J. Tilmans), W (Willemse) or other source of information; E, minimum and maximum number of observed spurs, if any, at the upper inner (= dorsal anterior) margin of the fore tibiae (Fig. 2) and their average number per tibia; F, taxonomic assignment as revised from the number of spurs at the upper inner margin of the fore tibia.

Column A	B	C	D	E		F
TAXA **Traditional classification** from **armature** of tip of **hind tibia** (number of ventral spurs, see Table 1)	Approximate distribution	n	Depository or reference	Number of spurs on upper inner margin of fore tibia: Minimum & maximum of left and right fore tibia	Number of spurs on upper inner margin of fore tibia: Average number of spurs, unilateral	**Preliminary classification** from **armature** of **fore tibia** (number of upper inner spurs)
PTEROLEPIS type sp. *Pterolepis spoliata* Rambur 1839						**PTEROLEPIS** type sp. *P. spoliata* Rambur 1839
spoliata spoliata Rambur 1838	Spain	3	H	0-0 → 0-0	0.00	*Pterolepis*
spoliata minor Bolivar 1899	Spain	0		?	?	*Pterolepis* ?
spoliata kaltenbachi Galvagani 1981	Portugal	0		?	?	*Pterolepis* ?
spoliata llorenteae Galvagni 1961	Spain	0		?	?	*Pterolepis* ?
spoliata nadigi Galvagni 1981	Spain	5	G; H	0-0 → 0-0	0.00	*Pterolepis*
spoliata nevadensis Galvagni 1981	Spain	6	G; H	0-0 → 0-0	0.00	*Pterolepis*
spoliata pascuali Galvagni 1981	Spain	0		?	?	*Pterolepis* ?
spoliata raggei Galvagni 1981	Spain	0		?	?	*Pterolepis* ?
spoliata grallata (Pantel 1886)	Spain	±5	H; Pantel 1886; Bolivar 1899	0-0 → 0.0	0.00	*Pterolepis*
spoliata ssp.?	Spain	3	H	0-0 → 0-0	0.00	*Pterolepis*
spoliata ssp. ?	Spain	21	W	0-0 → 0-0	0.00	*Pterolepis*
cordubensis Bolivar 1900	Spain	0		?	?	*Pterolepis* ?
pedata Costa 1882	Sardinia	76	F;G;K	0-0 → 0-0	0.00	*Pterolepis*
elymica Galvagni & Massa 1980	Sicily	12	F;G	0-0 → 0-0	0.00	*Pterolepis*
gessardi Bonnet 1886	Tunisia, Algeria	5	F; G	0-0 → 0-0	0.00	*Pterolepis*
theryana Uvarov 1927	Morocco	0		?	?	*Pterolepis* ?

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RHACOCLEIS type sp. *Rhacocleis annulata* Fieber 1853						
maroccana Bolivar 1905	Morocco	3	G	0-0 → 0-0	0.00	*Pterolepis*
pieltaini Morales Agacino 1940	Morocco	3	G	0-0 → 0-0	0.00	*Pterolepis*
claudiae Galvagni 1988	Morocco	15	F; G	0-0 → 0-0	0.00	*Pterolepis*
adolphorum Galvagni 1988	Morocco	2	G	0-0 → 0-0	0.00	*Pterolepis*
moralesi Galvagni 1988	Morocco	3	G	0-0 → 0-0	0.00	*Pterolepis*
berberica berberica Galvagni 1989	Algeria	0		?	?	*Pterolepis* ?
berberica dubronyi Baccetti e.al. 1995	Sicily	0		?	?	*Pterolepis* ?
korsakovi Uvarov 1942	Algeria	0		?	?	*Pterolepis* ?
kabylica Galvagni & Fontana 2000	Algeria	1	F	0-0	0.00	*Pterolepis*
silviarum Galvagni 1984	Algeria	3	G	0-0 → 0-0	0.00	*Pterolepis*
algerica Uvarov 1935	Algeria	0		?	?	*Pterolepis* ?
augustini Galvagni 2001	Algeria	3	G; W	0-0 → 0-1	0.16	*Pterolepis*
galitana Uvarov 1942	Tunisia	0		?	?	*Pterolepis* ?
maura Bonnet1886	Tunisia	0		?	?	*Pterolepis* ?
lagrecai Fontana & Massa 2004	Libya	2	F	0-0 → 0-0	0.00	*Pterolepis*
dernensis Salfi 1926	Libya	0		?	?	*Pterolepis* ?
bidens Uvarov 1924	Egypt	0		?	?	*Pterolepis* ?
						RHACOCLEIS type sp. *Rhacocleis annulata* Fieber 1853
ayali Karabag 1974	Israel	0		?	?	*Rhacocleis* ?
tuberculata Karabag 1978	Anatolia	2	C	1-1	1.00	*Rhacocleis*
turcica (Uvarov 1930)	Anatolia	10	C; W	2-2 → 2-2	2.00	*Rhacocleis*
acutangula Karabag 1957	Anatolia	0		?	?	*Rhacocleis* ?
anatolica Werner 1933	Aegean, Anatolia	8	W	2-2 → 2-2	2.00	*Rhacocleis*
agiostratica Werner 1937	Aegean	0		?	?	*Rhacocleis* ?
uvarovi Ramme 1939	Aegean	0		?	?	*Rhacocleis* ?
silvestrii Ramme 1939	Aegean	2	Uvarov 1942	1-1 → 1-1	1.00	*Rhacocleis*
distinguenda Werner 1934	Aegean	5	W	2-2 → 2-2	2.00	*Rhacocleis*
insularis Ramme 1928	Aegean	20	H; W	0-1 → 2-2	1.92	*Rhacocleis*
derrai Harz 1983	Greece	4	H	0-1 → 1-1	0.90	*Rhacocleis*
andikithiriensis Tilmans (in press)	Greece	1	T	2-2	2.00	*Rhacocleis*
lithoscirtetes sp.n.	Greece	47	W	1-2 → 3-3	2.09	*Rhacocleis*
crypta sp.n.	Greece	26	H, W	1-1 → 2-2	1.85	*Rhacocleis*
werneri F. Willemse 1982	Greece	45	F; H;W	1-1 → 3-3	2.00	*Rhacocleis*
graeca Uvarov 1942	Greece	26	H; W	1-1 → 3-3	2.03	*Rhacocleis*
trilobata La Greca & Messina 1974	Greece	5	F; W	2-2 → 3-3	2.27	*Rhacocleis*
edentata F. Willemse 1982	Greece	36	H; W	1-1 → 2-3	1.94	*Rhacocleis*
ferdinandi L. Willemse & Tilmans 1986	Greece	13	H; W	1-2 → 2-2	1.96	*Rhacocleis*
bucchichi Hermann 1874	Dalmatia	6	H; K	1-1 → 1-2	1.30	*Rhacocleis*
neglecta (Costa 1863)	Italy	127	F; G; H; W	0-0 (1 – 2%) → 3-3	1.88	*Rhacocleis*
annulata Fieber 1853	Sicily	9	F; W	1-1 → 3-3	2.00	*Rhacocleis*
japygia La Greca 1957	Italy	12	F; W	2-2 → 3-3	2.27	*Rhacocleis*
tyrrhenica La Greca 1952	Italy	6	F; H	1-1 → 2-2	1.16	*Rhacocleis*
grisea Baccetti 1991	Sardinia	2	F	0-1 → 1-1	0.75	*Rhacocleis*
minerva Baccetti 1991	Sardinia	1	F	2-2	2.00	*Rhacocleis*
baccettii Galvagni 1976	Sardinia	0		?	?	*Rhacocleis* ?
bonfilsi Galvagni 1976	Corsica	0		?	?	*Rhacocleis* ?
corsicana Bonfils 1960	Corsica	1	F	2- ?	2.00	*Rhacocleis*
germanica (Herrich-Schaeffer 1840)	France-NW Turkey	±500	H; K; T; W	1-2 → 3-3	2.00	*Rhacocleis*
poneli Harz & Voisin 1987	France	8	F; W	0-0 → 1-1	0.56	*Rhacocleis*
lusitanica (Bolivar1899)	Portugal	1	Bolivar 1899	1-1	1.00	*Rhacocleis*

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