

Synonyms and distributional corrections of *Trechus* CLAIRVILLE, 1806 (Coleoptera: Carabidae: Trechini) from the Eastern Alps

Martin DONABAUER

Abstract

The following 14 new synonyms are established within *Trechus* CLAIRVILLE, 1806 from the Eastern Alps: *Trechus alpicola* STURM, 1825 = *T. alpicola koralpicus* FRANZ, 1969 syn.n.; *T. elegans obirensis* SCHÖNMANN, 1937 = *T. elegans hoelzeli* SCHWEIGER, 1950 syn.n.; *T. longicollis longicollis* MEIXNER, 1912 = *T. longicollis arcuatus* JEANNEL, 1927 syn.n.; *T. limacodes* DEJEAN, 1831 = *T. limacodes jucundus* CSIKI, 1912 syn.n.; *T. longulus* K. DANIEL & J. DANIEL, 1898 = *T. longulus montiscanini* JEANNEL, 1927 syn.n.; *T. ovatus* PUTZEYS, 1846 = *T. ovatus penecke* GANGLBAUER, 1896 syn.n.; *T. rotundatus* DEJEAN, 1831 = *T. rotundatus kraussi* GANGLBAUER, 1896 syn.n.; *T. rotundipennis* DUFTSCHMID, 1812 = *T. rotundipennis cordicollis* WINKLER, 1936 syn.n. = *T. rotundipennis scheerpeltzi* WINKLER, 1936 syn.n.; *T. schaumii* PANDELLÉ, 1867 = *T. brebmanus* FOCARILE, 1950 syn.n. = *T. intrusus* FOCARILE, 1950 syn.n. = *T. longobardus* PUTZEYS, 1870 syn.n. = *T. marianii* FOCARILE, 1949 syn.n. = *T. pygmaeus* K. DANIEL & J. DANIEL, 1898 syn.n. Two taxa receive a new rank: *Trechus danieli danieli* HOLDHAUS, 1902 stat.n. for *T. longulus danieli* HOLDHAUS, 1902; *T. danieli perinii* HOLDHAUS, 1950 stat.n. for *T. perinii* HOLDHAUS, 1950. *Trechus longulus cavallensis* JEANNEL, 1927 is transferred to *T. danieli cavallensis* JEANNEL, 1927 comb.n.

The following new faunistic corrections are established: *Trechus cuniculorum* MEQUIGNON, 1921 deleted from the fauna of Austria; *T. limacodes* DEJEAN, 1831 deleted from the fauna of Italy, Croatia and Serbia; *T. rotundipennis* DUFTSCHMID, 1812 and *T. constrictus* SCHAUM, 1860 deleted from the fauna of Serbia; *T. striatulus* PUTZEYS, 1847 deleted from the fauna of Austria. Additional published faunistic clarifications and synonymizations are summarized.

Key words: Carabidae, *Trechus*, Alps, taxonomy, biogeography.

Zusammenfassung

Folgende 14 neue Synonyme werden innerhalb der Gattung *Trechus* CLAIRVILLE, 1806 aus den Ostalpen erstellt: *Trechus alpicola* STURM, 1825 = *T. alpicola koralpicus* FRANZ, 1969 syn.n.; *T. elegans obirensis* SCHÖNMANN, 1937 = *T. elegans hoelzeli* SCHWEIGER, 1950 syn.n.; *T. longicollis longicollis* MEIXNER, 1912 = *T. longicollis arcuatus* JEANNEL, 1927 syn.n.; *T. limacodes* DEJEAN, 1831 = *T. limacodes jucundus* CSIKI, 1912 syn.n.; *T. longulus* K. DANIEL & J. DANIEL, 1898 = *T. longulus montiscanini* JEANNEL, 1927 syn.n.; *T. ovatus* PUTZEYS, 1846 = *T. ovatus penecke* GANGLBAUER, 1896 syn.n.; *T. rotundatus* DEJEAN, 1831 = *T. rotundatus kraussi* GANGLBAUER, 1896 syn.n.; *T. rotundipennis* DUFTSCHMID, 1812 = *T. rotundipennis cordicollis* WINKLER, 1936 syn.n. = *T. rotundipennis scheerpeltzi* WINKLER, 1936 syn.n.; *T. schaumii* PANDELLÉ, 1867 = *T. brebmanus* FOCARILE, 1950 syn.n. = *T. intrusus*

FOCARILE, 1950 syn.n. = *T. longobardus* PUTZEYS, 1870 syn.n. = *T. marianii* FOCARILE, 1949 syn.n. = *T. pygmaeus* K. DANIEL & J. DANIEL, 1898 syn.n. Zwei Taxa erhalten einen neuen Rang: *T. danieli danieli* HOLDHAUS, 1902 stat.n. für *T. longulus danieli* HOLDHAUS, 1902; *T. danieli perinii* HOLDHAUS, 1950 stat.n. für *T. perinii* HOLDHAUS, 1950. *Trechus longulus cavallensis* JEANNEL, 1927 wird zu *T. danieli cavallensis* JEANNEL, 1927 comb.n. transferiert.

Folgende faunistischen Daten werden korrigiert: *Trechus cucicularum* MEQUIGNON, 1921 wird von der Fauna Österreichs gestrichen, *T. limacodes* DEJEAN, 1831 von den Faunen Italiens, Kroatiens und Serbiens, *T. rotundipennis* DUFTSCHMID, 1812 und *T. constrictus* SCHAUM, 1860 von der Fauna Serbiens sowie *T. striatulus* PUTZEYS, 1847 von jener Österreichs. Zusätzlich werden bereits publizierte faunistische Korrekturen und Synonyme zusammengefasst.

Introduction

The extraordinarily diverse genus *Trechus* CLAIRVILLE, 1806, with approximately one thousand species in the northern hemisphere, is well-known for many endemic species from islands and mountains and a hidden mode of life in and on the ground in cool and moist habitats. The taxonomy of *Trechus* is complicated because of the uniform appearance of most species on the one hand and high infraspecific variability – caused by low dispersal power and small population sizes – on the other. Thus, taxonomy is based primarily on characteristics of the aedeagi of males.

The *Trechus* from the Alps are especially diverse with approximately 80 species recognized in total and circa 55 species in the Eastern Alps alone. Several taxa need to be reviewed, because their original descriptions are based on mislabelled or insufficient material, or because they were described using an outdated, narrow species concept. Modern methods like genetic phylogenies provide additional information on problematic taxa, but have not been translated to taxonomic changes yet.

The main purposes of this paper are (1) the formal establishment or confirmation of synonymies in order to improve their availability for upcoming catalogues; (2) the correction of serious errors in published distributions based on mislabelled material; and finally (3) to provide an updated list of species from the Eastern Alps.

Material and methods

This study is based on thousands of specimens of *Trechus* collected by myself during the past 20 years in the Eastern Alps, including all species and subspecies from the type localities currently described. Type material was not studied, because the information given in the original descriptions including the type localities are sufficient to identify specimens.

A practicable and comparable species concept within *Trechus* needs to be defined for this study. Species delimitation in allopatric populations – where interbreeding under natural conditions is lacking per definition – is a subjective task. Some authors (e.g., FOCARILE 1950) did not distinguish between populations and species, which resulted in indistinguishable taxa based on separated distribution areas alone. However, the climate in the Alps significantly changed within the last 20,000 years and many of today's fragmented areas were connected a few thousand years ago – recently, considering the evolutionary time frame.

A few pairs of closely related species are known to coexist in sympatry in the Alps (e.g., *T. pumilus* and *T. sinuatus*; *T. tristiculus* and *T. sinuatus*; *T. magistrettii* and *T. barii*; *T. stri-*

gipennis and *T. montisrosae*; *T. alpicola*, *T. limacodes* and *T. ovatus*). In all these cases both ecological and morphological differences (at least in aedeagi of males) are minor but measurable and constant. Other important examples from outside the Alps are the radiation of the *T. obtusus* group on Madeira (LOMPE 1999), or the *T. (Microtrechus) vandykei* group on Catalochee Bald in the southern Appalachians with five sympatric species (DONABAUER 2009). These examples provide excellent thresholds for morphological differences between distinct species (proven by sympatry), which should be expected from allopatric species as well.

In parapatric distributions, as seen in the extraordinary similar species of the *T. subnotatus* group, so far neither interbreeding nor overlapping distribution areas are known (DONABAUER 2015). Therefore, these taxa are treated as species herein, which may be revised in the course of future studies.

Thus I consider two taxa as distinct species, in case at least one of the following conditions is complied with:

- Sympatric populations exist without significant interbreeding.
- At least one characteristic of the males' aedeagi unambiguously allows separation.
- Disjunctive populations, separated by closely related species or areas, where populations could have survived both the last glaciation maxima and minima but do not exist.
- Different mode of life.

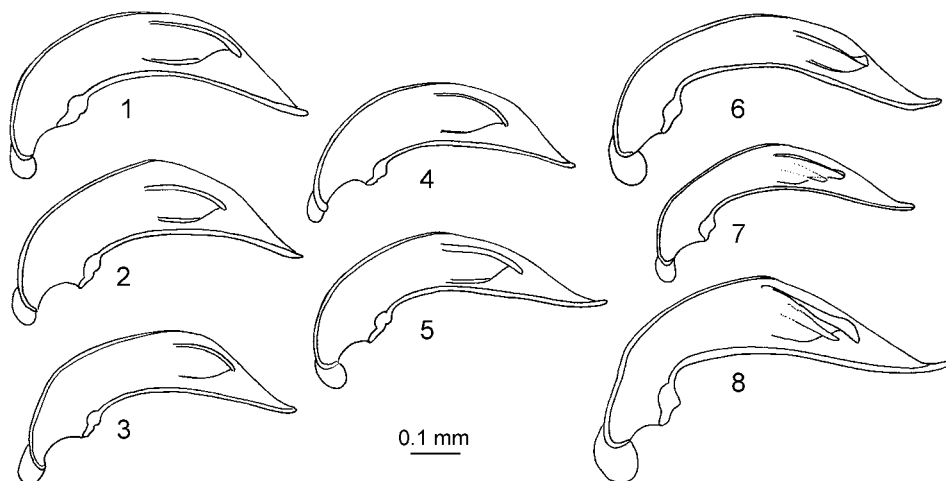
Molecular sequences have been downloaded from GenBank, aligned with Clustal X and analysed with Mega 7.

Results and discussion

Trechus cuniculorum is reported from Lower Austria by several authors (e.g. HORION 1941, LOMPE 2004), although often with doubt. This is a rarely collected, winged species confined to a narrow coastal belt from Portugal to Northern France. I have collected it in large numbers from dry leaf litter under *Eucalyptus* shrubs on sand dunes along the Atlantic coast in northern Portugal. This taxon is very similar to the widespread *T. quadristriatus* and *T. obtusus* and can be distinguished by aedeagal characteristics alone. This species has never been reported from Austria or any other neighbouring country based on dissected specimens. Therefore, this species should be eliminated from the fauna of Austria.

SCHÖNMANN (1937) reviewed in his excellent work the "alpine" *Trechus* from the Eastern Alps. He concluded that *Trechus longulus longulus* from the Alpi Giulie / Julijske Alpe at the border of Italy and Slovenia is variable and cannot be divided into further subspecies. Therefore, he concluded, *T. longulus montiscanini* should be considered as synonym of *T. longulus longulus*. Based on large series from several mountains in the area I can confirm his findings. However, his publication was ignored in this respect in important catalogues (CASALE & LANEYRIE 1982, MORAVEC et al. 2003).

Furthermore, the extraordinarily similar taxa *Trechus perinii* and *T. longulus danieli* (north and south of Val Sugana) as well as *T. longulus cavallensis* (Monte Cavallo) should not be considered as subspecies of *T. longulus*, because there are both aedeagal differences and significant distributional gaps with *T. dolomitanus* and *T. stricticollis* in between. I consider these three taxa as subspecies of a polytypic *T. danieli*. A final decision on the taxonomic status of these three taxa has to be postponed until molecular data are available.



Figs. 1–8: Aedeagi of all members of the *Trechus pertyi* group from the Alpi Orobie: (1) *T. schaumii* from Splügenpass (border between Italy and Switzerland); (2) *T. brembanus* syn.n. = *T. schaumii* from Monte Ponteranica; (3) *T. pygmaeus* syn.n. = *T. schaumii* from Grigna settentrionale; (4) *T. marianii* syn.n. = *T. schaumii* from Zuccone Campelli; (5) *T. montisarerae*; (6) *T. insubricus*; (7) *T. magistrettii*; (8) *T. barii*.

SCHÖNMANN (1937) described *Trechus ovatus peneckeii* from “Hochlantsch” based solely on the smaller body size than in the nominate form *T. ovatus ovatus*. Extensive material from different locations shows all variations of body size. For example, another population of equally small body size exists on the “Göbeck” (2,214 m) in the Eisenerzer Alpen with intermediate populations in the surrounding areas. Therefore, body size alone should not be used to separate subspecies, and *T. ovatus peneckeii* is considered as synonym of the nominate *T. ovatus*.

FOCARILE (1949, 1950) treated the members of the *Trechus pertyi* group from the Alpi Orobie and described six new species, recognizing altogether ten species in this relatively small area. Unfortunately, he created such a confusion of the taxonomic situation, it could not be resolved until today. This issue was already discussed by FRANZ (1971). More recently a genetic investigation was performed (LOHSE et al. 2010), sampling 150 specimens from twelve populations over the entire range. The mitochondrial sequences (1,400 nucleotides length each) have been downloaded from GenBank (BENSON et al. 2004). After elimination of three questionable sequences and adding two widespread taxa as outgroups, a phylogenetic tree was calculated (Fig. 9). Five distinct species could be recognized without doubt in the Alpi Orobie. *Trechus magistrettii* and *T. barii* from Pizzo Presolana, *T. insubricus* from the northern and northeastern parts, and finally a misidentified species from two locations of the northern ridge. However, all populations sampled from the western part (*T. pygmaeus*, *T. intrusus*, *T. brembanus*) could not be resolved at all and fell together with *T. schaumii* from Passo di Spluga (northwest of the Alpi Orobie) in a well-supported clade, resembling a single species with highest statistical confidence. Two more species have been described from the western Alpi Orobie: *T. marianii*, which cannot be distinguished from *T. pygmaeus* (Figs. 2, 3), and finally *T. longobardus*. A genetic barcode of *T. longobardus* (unpublished data from the Tiroler Landesmuseum, Innsbruck) was available, confirming the synonymy with high statistical confidence.

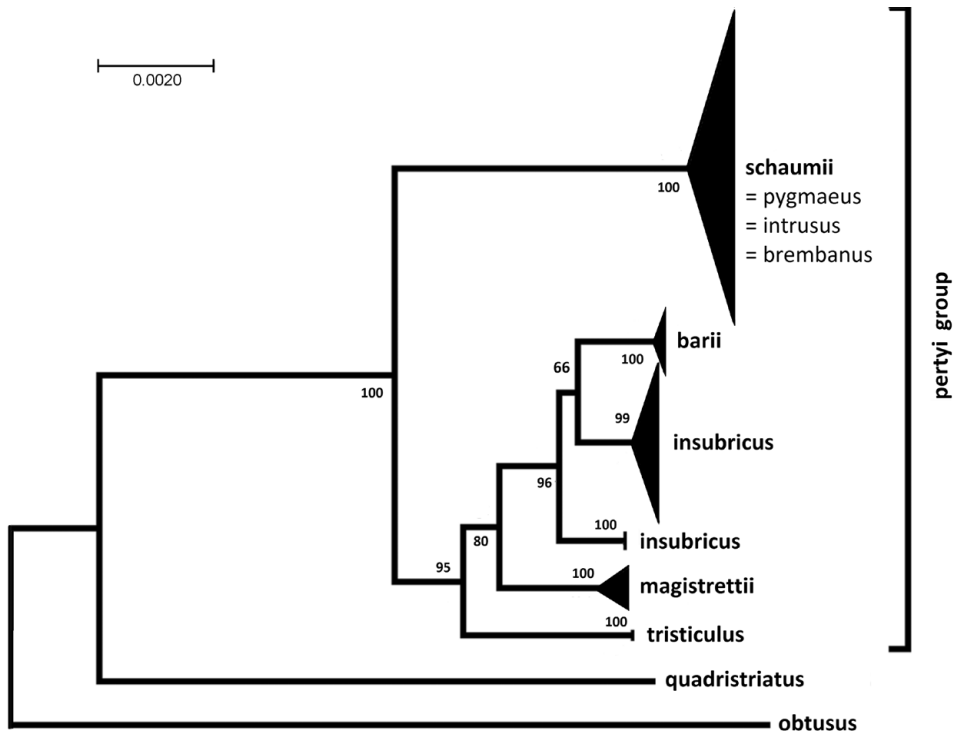


Fig. 9: Molecular phylogeny of the *T. pertyi* group from Alpi Orobie based on 150 nucleotide sequences with 1430 positions each, computed with MEGA7 using the Neighbour-Joining method with 500 bootstraps.

There are no relevant differences in male aedeagi (Figs. 1–4), habitus, mode of life and available mitochondrial sequences. Therefore, I consider all five western taxa (*T. bremanus*, *T. intrusus*, *T. longobardus*, *T. marianii*, and *T. pygmaeus*) as conspecific with *T. schaumii*. The distribution of this “combined” species (Fig. 10) is not restricted to the Alpi Orobie. This and a molecular phylogeny (LOHSE et al. 2010) indicate a recolonization of interior parts of the Alps from a few refugia (like Grigna settentrionale). The closest related taxon seems to be *T. montisarerae* (Fig. 5), but this will require further investigation. Three more taxa from the eastern Alpi Orobie can be confirmed by genital morphology (Figs. 6–8) and mitochondrial sequences (Fig. 9).

SCHWEIGER (1950) described three new taxa, all of doubtful value. However, *Trechus elegans hoelzeli* (description based on two specimens from the “Koschutnik Turm”) is a synonym of *Trechus elegans obirensis*, distributed in the eastern “Karawanken” and “Steiner Alpen / Kamniške Alpe”. This decision is based on careful comparison of elaborate material of all known populations and subspecies of *Trechus elegans*, including dissection of aedeagi. Furthermore, unpublished genetic data (both mitochondrial and nuclear) do not show any differences between the populations of the type localities “Obir” and “Koschutnik Turm”.

SCHWEIGER (1955) reviewed the taxonomy and distribution of the “subalpine” species of *Trechus* from the Eastern Alps in detail. He concluded that *Trechus rotundipennis* and

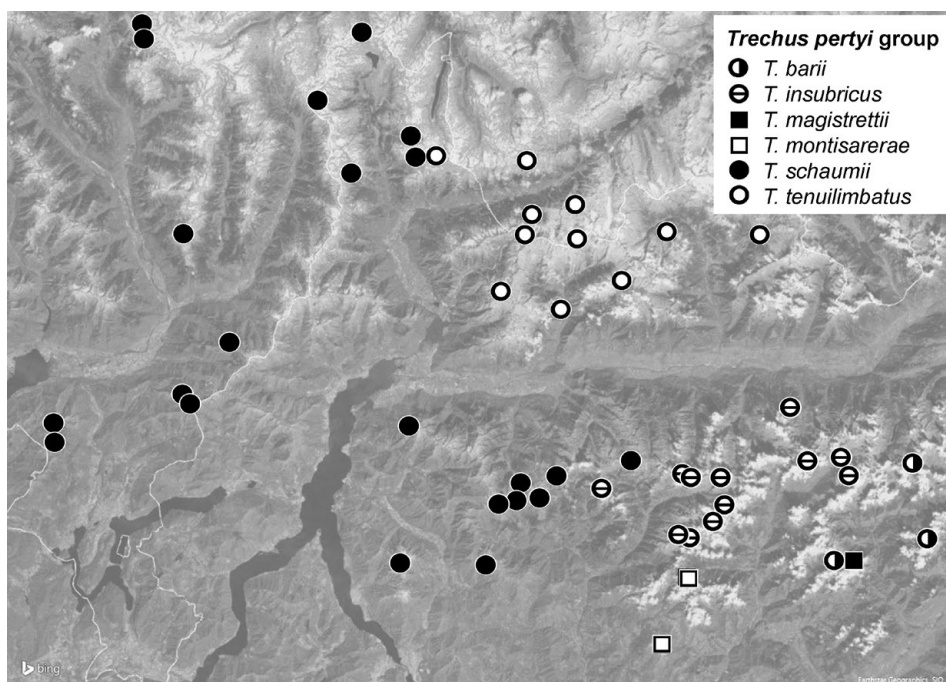


Fig. 10: Distribution of the *Trechus pertyi* group in the Alpi Orobie and north of Val Sondrio. Locations from FOCARILE (1950, 1992), modified.

Trechus rotundatus show high variability within the same population and thus both do not consist of different subspecies. Based on hundreds of specimens from many different locations of both taxa I can confirm his conclusions. However, his publication was ignored in important catalogues (MORAVEC et al. 2003, CASALE & LANEYRIE 1982).

Interestingly the same author (SCHWEIGER 1955) argued in the same paper differently in the case of *Trechus longicollis*. This species was split into three subspecies according to the three locations this species is known to occur. The mentioned separating characteristics (basal angles of pronotum, shape of elytra, and ratio of length/width of pronotum) are variable and I am not able to separate specimens from the three populations. The aedeagus of *T. longicollis* is extraordinarily complex and absolutely identical. The two subspecies from “Saualpe” and “Seetaler Alpe” are not separated geographically either: These mountains are connected at the pass “Klippitztörl” at ca. 1600 m, where *T. longicollis* is common. Thus at least *T. longicollis arcuatus* needs to be synonymized with *T. longicollis longicollis*. *Trechus longicollis slovenicus* is well separated geographically and isolated and needs further investigations.

At this point – although described from the Western Alps – a recently published synonym of the same species group should be repeated and confirmed: LOMPE (2011) formally synonymized *Trechus latus grouvellei* with *T. latus*, which is absolutely correct. Unfortunately, it was not mentioned in the abstract (although crystal-clear in the text), that

this species exists neither in Italy nor in France. This species has to be deleted from the fauna of the Alps!

SCHWEIGER (1955) noted, that *Trechus limacodes jucundus* was reported from Velebit (Croatia) based on mislabelled specimens. *Trechus limacodes* has never been found again in Croatia. *Trechus limacodes jucundus* should therefore be regarded as a synonym of *Trechus limacodes limacodes* and deleted from the fauna of Croatia. The species was erroneously recorded from Italy by MORAVEC et al. (2003).

FRANZ (1969) described a new subspecies of *Trechus alpicola* from the Koralpe in Austria. This common, comparably widespread and variable species of the eastern Alps (SCHWEIGER 1955) and adjacent areas north of the Danube (Austria, Czech Republic, Germany) is another source of several misunderstandings. Having studied hundreds of specimens and genetic data, I can confirm that *T. alpicola* is an unusually complex, old and variable species which deserves further taxonomic attention. However, I cannot agree with FRANZ (1969) who split off solely the population from the Koralpe as a subspecies of its own. Furthermore, I did not succeed in confirming the mentioned aedeagal differences of the description. Thus I suggest to consider *T. alpicola koralpicus* as synonymous with the nominate form. The same author stated that the populations north of the Danube from Austria are based on misidentified *T. striatulus* (FRANZ 1985), which is certainly not correct. *Trechus alpicola* has been frequently collected and confirmed on the highest elevations around the trijunction of Austria, Czech Republic and Germany, which may constitute an undescribed subspecies. *Trechus striatulus* does not exist in Austria. Another doubtful, highly isolated population is *T. alpicola acutangulus* described from the surroundings of Sarajevo (Bosnia and Herzegovina) and stated to be indistinguishable from specimens from the Alps (MEIXNER 1912). I am not aware of any published findings after its description and the presence of this taxon in the type locality urgently needs confirmation to eliminate the possibility that it was based on mislabelled specimens.

GUÉORGUIEV (2008) reported twenty species of Carabidae new for Serbia, including *Trechus constrictus*, *T. limacodes* and *T. rotundipennis* from Fruška Gora (highest elevation at Crveni Čot, 539 m). These three species are restricted in distribution within parts of the Eastern Alps (Slovenia and Austria) and prefer moist and cool forests between 1,000 and 1,500 m elevation. There is certainly no habitat for these taxa in Fruška Gora. Furthermore, Fruška Gora is completely isolated from the distributional areas of these species. These records are based on mislabelled specimens and should be deleted from the fauna of Serbia. Likely it is the same for *Pterostichus jurinei* (PANZER, 1803), *Pterostichus illigeri* (PANZER, 1803) and *Trichotichnus laevicollis* (DUFTSCHMID, 1812).

ALLEGRO & GIACHINO (2016) described nine new *Trechisibus* MOTSCHULSKY, 1862, five from Peru and four from Argentina. The specimens from Argentina are obviously mislabelled and are common, forest dwelling *Trechus* from the Eastern Alps, most likely from the mountain “Koralpe” in Austria, the single place where all species occur together. The excellent photos of habitus and aedeagus and the sufficient description do not leave any doubt about the true identity and origin of these species. The synonyms have already been established by ALLEGRO & GIACHINO (2017).

The *Trechus subnotatus* group is among the most complicated and confusing groups in the Alps. Important additions have been published in recent years. Three additional species have been recorded from Italy, Slovenia and Austria (DONABAUER, 2015): *Trechus schwienbacheri* (Italy), *T. schoenmanni* (Slovenia and Austria) and *T. andreinii* (Italy and Slovenia). Another recently described species, *T. kahleni* (DONABAUER & LEBENBAUER 2003)

from the Alpi Orobie was synonymized by DEGIOVANNI et al. (2016) with *T. binotatus* as a dark variation. The latter was removed from synonymy with *T. fairmairei*. DEGIOVANNI et al. (2016) further identified *T. fairmairei* to be restricted to a small area around Nice (Nizza) in the western Alps and the common widespread Italian species previously known as *T. fairmairei* had to be renamed to *T. binotatus*.

Trechus montiscrystalli (= *T. pecoudi*) was erroneously assigned to the *T. pertyi* group and based on a mislabelled specimen from Monte Cristallo. This especially complicated taxonomic case was discussed in detail by CASALE & MAGRINI (2013) who synonymized *T. montiscrystalli* with *T. italicus* in the *T. subnotatus* group, a species from the Central Apennine in Italy. This species has to be deleted from the fauna of the Alps.

Taxonomic changes and correction of distribution (in alphabetical order of species):

Trechus alpicola STURM, 1825

= *Trechisibus brevis* ALLEGRO & GIACHINO, 2016

= *Trechus alpicola koralpicus* FRANZ, 1969 syn.n.

This species has to be deleted from the fauna of Argentina.

Trechus binotatus PUTZEYS, 1870

= *Trechus kahleni* DONABAUER & LEBENBAUER, 2003

Trechus constrictus SCHAUM, 1860

This species has to be deleted from the fauna of Serbia.

Trechus cuniculorum MEQUIGNON, 1921

This species has to be deleted from the fauna of Austria.

Trechus danieli cavallensis JEANNEL, 1927 comb.n.

= *Trechus longulus cavallensis* JEANNEL, 1927

Trechus danieli danieli HOLDHAUS, 1902 stat.n.

= *Trechus longulus danieli* HOLDHAUS, 1902

Trechus danieli perinii HOLDHAUS, 1950 stat.n.

= *Trechus perinii* HOLDHAUS, 1950

Trechus elegans obirensis SCHÖNMANN, 1937

= *Trechus elegans hoelzeli* SCHWEIGER, 1950 syn.n.

Trechus fairmairei PANDELLÉ, 1867

This species has to be deleted from the fauna of the Eastern Alps.

Trechus grandis GANGLBAUER, 1891

= *Trechisibus sciakyi* ALLEGRO & GIACHINO, 2016

This species has to be deleted from the fauna of Argentina.

Trechus latus PUTZEYS, 1847

= *Trechus latus grouvellei* JEANNEL, 1927

This species has to be deleted from the fauna of Italy and France.

Trechus longicollis longicollis MEIXNER, 1912

= *Trechus longicollis arcuatus* JEANNEL, 1927 syn.n.

Trechus limacodes DEJEAN, 1831

= *Trechisibus parvulus* ALLEGRO & GIACHINO, 2016

= *Trechus limacodes jucundus* CSIKI, 1912 syn.n.

This species has to be deleted from the fauna of Italy, Croatia, Serbia, and Argentina.

Trechus longulus K. DANIEL & J. DANIEL, 1898

= *Trechus longulus montiscanini* JEANNEL, 1927 syn.n.

Trechus italicus K. DANIEL & J. DANIEL, 1898

= *Trechus pecoudi* JEANNEL, 1937 nec *T. brucki pecoudi* COLAS & GAUDIN, 1935

= *Trechus montiscrystalli* CASALE, 1979

This species has to be deleted from the fauna of the Alps.

Trechus ovatus PUTZEYS, 1846

= *Trechus ovatus peneckeii* GANGLBAUER, 1896 syn.n.

Trechus rotundatus DEJEAN, 1831

= *Trechus rotundatus kraussi* GANGLBAUER, 1896 syn.n.

Trechus rotundipennis DUFTSCHMID, 1812

= *Trechisibus longipennis* ALLEGRO & GIACHINO, 2016

= *Trechus rotundipennis cordicollis* WINKLER, 1936 syn.n.

= *Trechus rotundipennis scheerpeltzi* WINKLER, 1936 syn.n.

This species has to be deleted from the fauna of Argentina and Serbia.

Trechus schaumii PANDELLÉ, 1867

= *Trechus brembanus* FOCARILE, 1950 syn.n.

= *Trechus intrusus* FOCARILE, 1950 syn.n.

= *Trechus longobardus* PUTZEYS, 1870 syn.n.

= *Trechus marianii* FOCARILE, 1949 syn.n.

= *Trechus pygmaeus* K. DANIEL & J. DANIEL, 1898 syn.n.

= *Trechus barajoni* FOCARILE, 1949

= *Trechus larianus* FOCARILE, 1949

= *Trechus schaumii splugensis* Jeannel, 1927

Trechus splendens GEMMINGER & HAROLD, 1868

= *Trechisibus striatus* ALLEGRO & GIACHINO, 2016

This species has to be deleted from the fauna of Argentina.

Trechus striatulus PUTZEYS, 1847

This species has to be deleted from the fauna of Austria.

List of *Trechus* from the Eastern Alps

This list is based on established groups reorganized following molecular phylogenies, partly unpublished yet.

***Epaphius* group**

rivularis GYLLENHAL, 1810

secalis PAYKULL, 1790

***rubens* group**

rubens (FABRICIUS, 1792)

***alpicola/limacodes/ochreateus* group**

alpicola STURM, 1825

limacodes DEJEAN, 1831

ssp. *limacodes* DEJEAN, 1831

ssp. *latusculus* K. DANIEL & J. DANIEL, 1898

pinkeri GANGLBAUER, 1891

wagneri GANGLBAUER, 1906

ovatus PUTZEYS, 1846

ssp. *dispar* SCHÖNMANN, 1937

ssp. *ovatus* PUTZEYS, 1846

latibuli JEANNEL, 1948

ochreateus DEJEAN, 1831

rudolphi GANGLBAUER, 1891

***austriacus* group**

austriacus DEJEAN, 1831

***rotundipennis* group**

rotundipennis DUFTSCHMID, 1812

***latus/subnotatus* group**

grandis GANGLBAUER, 1891

longicollis MEIXNER, 1912

ssp. *longicollis* MEIXNER, 1912

ssp. *slovenicus* SCHWEIGER, 1950

andreinii JEANNEL, 1921

binotatus PUTZEYS, 1870

pilisensis CSIKI, 1918

schoenmanni DONABAUER & LEBENBAUER, 2005

schwienbacheri DONABAUER & LEBENBAUER,

2003

***gracilitarsis* group**

gracilitarsis K. DANIEL & J. DANIEL, 1898

***obtusus/constrictus/pallidulus* group**

obtusus ERICHSON, 1837

constrictus SCHAUM, 1860

ssp. *constrictus* SCHAUM, 1860

ssp. *franzi* SCHWEIGER, 1950

meschniggi JEANNEL, 1930

morandinii LEBENBAUER, 2003

pallidulus GANGLBAUER, 1891

ssp. *pallidulus* GANGLBAUER, 1891

ssp. *augusti* JEANNEL, 1931

***montanellus* group**

carnioliae MÜLLER, 1921

pohorjeensis DONABAUER, 2006

silvicola K. DANIEL & J. DANIEL, 1898

***pulchellus/splendens/osmanilis* group**

splendens GEMMINGER & HAROLD, 1868

***elegans/croaticus* group**

croaticus DEJEAN, 1831

elegans PUTZEYS, 1847

ssp. *elegans* PUTZEYS, 1847

ssp. *carniolicus* GANGLBAUER, 1896

ssp. *obirensis* SCHÖNMANN, 1937

ssp. *schusteri* GANGLBAUER, 1891

***quadristriatus/pyreaneus* group**

quadristriatus (SCHRANK, 1781)

laevipes JEANNEL, 1927

***nigrinus/obtusiusculus* group**

nigrinus PUTZEYS, 1847

rotundatus DEJEAN, 1831

bergamascus JEANNEL, 1927

orobicus MONGUZZI, 2015

pertyi group

noricus MEIXNER, 1911
regularis PUTZEYS, 1870

barii FOCARILE, 1949

danieli HOLDHAUS, 1902

ssp. *cavallensis* JEANNEL, 1927

ssp. *danieli* HOLDHAUS, 1902

ssp. *perinii* HOLDHAUS, 1950

dolomitanus JEANNEL, 1931

ssp. *dolomitanus* JEANNEL, 1931

ssp. *jahni* SCHÖNMANN, 1937

glacialis HEER, 1837

hampei GANGLBAUER, 1891

insubricus K. DANIEL & J. DANIEL, 1898

longulus K. DANIEL & J. DANIEL, 1898

magistrettii FOCARILE, 1950

montisarerae FOCARILE, 1950

pertyi HEER, 1837

pseudopiceus K. DANIEL & J. DANIEL, 1898

pumilus JEANNEL, 1927

schaumii PANDELLE, 1867

sinuatus SCHAUM, 1860

stricticollis JEANNEL, 1927

tenuilimbatus K. DANIEL & J. DANIEL, 1898

tristiculus K. DANIEL & J. DANIEL, 1898

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- Author's address: DI Martin DONABAUER, Castellezgasse 1/7, 1020 Vienna, Austria.
E-mail: donabauer@gmx.at

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