# *Pentanota jani* sp. n. discovered in northern Europe (Coleoptera, Staphylinidae, Aleocharinae)

## JYRKI MUONA

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*Pentanota jani* **sp. n.** (Coleoptera, Staphylinidae, Aleocharinae, Oxypodini) is described from Finland. Formerly confused with the Siberian *Pentanota meuseli* Bernhauer and reported under this name, it is widespread in Finland and Sweden, and also present in Russian Karelia, Norway and Germany. Recent record of *Pentanota meuseli* from Poland very likely refers to *Pentanota jani*, as well. *Pentanota alpicola* Sawada is shown not to belong in *Pentanota* Bernhauer and it is provisionally regarded as *Neothetalia alpicola* (Sawada) **new combination**.

Jyrki Muona, Finnish Museum of Natural History, P.O.Box 17, FIN-00014 University of Helsinki. E-mail: jyrki.muona@helsinki.fi ORCID: 0000-0003-2771-1171

Bernhauer (1905) erected the genus Pentanota for one species, P. meuseli Bernhauer, on the basis of three specimens from Central and eastern Russia. One female came from the southwestern Baikal region (coll. Skalitzky) and two specimens had been collected in the Amur region (Meusel leg.). Jansson (1927) reported P. meuseli as new for Europe based on a Swedish specimen collected in Arvika, province of Värmland. The collector was G. A. Ringselle and Bernhauer had identified the specimen. Ringselle worked as a teacher in Arvika from 1906 to 1909, so this time period is the likely collecting date. Swedish and Finnish coleopterists had close ties and the news about this unexpected find travelled fast. Hellén (1928) reported Pentanota meuseli from Finland at the Helsinki entomological society meeting the same year. This record was based on two finds, a specimen found in Lohja, province Ab (Wegelius leg.) in 1925 and a score of specimens collected in Pälkäne, province Ta (Söderman leg.), in the summer and fall of 1926. Later research revealed that the earliest dated Finnish specimen had been collected by Håkan Lindberg in Lojo, province Ab, in August 1918. The first find of this species in Norway was made in AK 13: Röa, May 25<sup>th</sup>, 1945 (Strand 1946).

Today, we know that *P. meuseli* is widespread in both Finland and Sweden (BeetleBase 2022) and known from three areas in Norway (BeetleBase 2022). Lohse (1986) reported *P. meuseli* from Holstein, Germany, and noted that the Bernhauer collection contained a specimen from Poland and, unexpectedly, another one from Alaska, as well.

Palm (1972) illustrated the spermatheca of *P. meuseli*, noting that it was unusually small and simple. Lohse (1989) provided illustrations of the aedeagus, spermatheca and habitus of *P. meuseli*. Unfortunately, Lohse did not specify the origin of the specimens used for these illustrations. Based on the images of the spermatheca in Palm (1972) and Lohse (1989), the German and Swedish species appeared to be the same one. This may be illusory, however. Wolfgang Ziegler kindly sent an excellent picture of his German *Pentanota meuseli* specimen,

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Figure 1. *Pentanota jani* **sp. n.**, paratypes; – A) Finland, Ks, Kuusamo, male; – B) Finland, Sa, Ristiina, female; – C) Germany, Schleswig-Holstein, Koberg, male. Not in scale.

Figur 1. Pentanota jani **sp. n.**, paratyper; -A) Finland, Ks, Kuusamo, hane; -B) Finland, Sa, Ristiina, hona; -C) Tyskland, Schleswig-Holstein, Koberg, hane. Inte i skala.

a male, identified by Lohse. In connection with this, he also informed me that Lohse's illustration was not based on this specimen. As no other German specimens were known at the time, Lohse's drawings may well have been made from Swedish or Finnish material, or possibly even from the Polish specimen.

Klimaszewski (2008) studied the specimen Lohse (1989) reported as *P. meuseli* from Alaska. He showed that the female in question actually belonged to the genus Neothetalia Klimaszewski, not Pentanota. This prompted Klimaszewski to study the Siberian syntypes of P. meuseli in detail and designate a lectotype for the species. He found out that one of the two Amur syntypes in the Bernhauer collection in Chicago had been destroyed; only the male specimen remained. The third syntype, a female from the Baikal area, was available to him from the Wien Museum. Klimaszewski (2008) designated a lectotype and paralectotype, and provided digital images of the median lobe, parameres and spermatheca, as well as some other anatomical features. When comparing his observations with those of Lohse (1989) he came to two major conclusions. First, the spermatheca illustrated by Lohse differed substantially from that of the *P. meuseli* paralectotype. Second, the aedeagus illustrated in Lohse (1989) was fairly similar to the organ of the P. meuseli lectotype. As the lectotype and the paralectotype were collected from different localities, Klimaszewski suggested that there might be two species involved and urged Palaearctic researchers to look into the situation in detail.

When consulting Klimaszewski's paper, the image of the *P. meuseli* lectotype immediately struck as strange because of the wide head, Scandinavian specimens being conspicuously "microcephalic". After dissecting males and females from Finland it became clear that the Scandinavian and the Siberian species were two distinct taxa.

## **Collection abbreviations**

cEHe = E. Helve cEHy = E. Hyvärinen cIR = I. Rutanen cMP = M. Pentinsaari cPR = P. Rassi cSK = S. Karjalainen cTC = T. Clayhills cWZ = W. Ziegler JMC = J. Muona KNHM = Kuopio Natural History Museum MZH = Helsinki university Zoological Museum MZO = Oulu university Zoological Museum ZMT = Turku university Zoological Museum Ent. Tidskr. 144 (2023)

New species of Pentanota

# Genus Pentanota Bernhauer, 1905

#### Pentanota jani new species

Etymology: Named after my friend Jan Klimaszewski, Canada, who pointed out the *Pentanota* problem and provided tools to fix it. Type material

# Holotype:

**Finland, Ta**: Pälkäne, Henrik Söderman leg., 1926-07..10, male, labelled [Pälkäne] [H. Söderman] [Pentanota jani **sp. n**./HOLOTYPE/J.Muona des. 2022-02] (MZH; http://id.luomus.fi/GAC.33893). The actual location is the region around Samentaustaniemi, about 61° 38' N, 24° 41' E. Paratypes:

Finland, Ab: Lohja, Håkan Lindberg leg., 1918-08-27, female (MZH; http://id.luomus.fi/GAC.33903); Ta: Hattula, A. Wegelius leg., 1925, female (MZH; http://id.luomus.fi/GAC.339034); Pälkäne, H. Söderman leg., 1926-07..10, male (http://id.luomus. fi/GAC.33894) and four females (MZH; http:// id.luomus.fi/GAC.33895 - http://id.luomus.fi/ GAC.33898); Pälkäne, H. Söderman leg., 1926-07..10, male, dissected, dismembered and mounted in Euparal in 1975 (JMC); Sa: Ristiina, Linnaniemi leg., male (http://id.luomus.fi/GAC.33899, three females (MZH; http://id.luomus.fi/GAC.338900 http://id.luomus.fi/GAC.338902); female with same data (cEHe); Ks: Kuusamo, 736:60, J. Muona leg., 1981-07-28, 1982-07-05, 1983-08-10, two males, five females (JMC).

**Germany**, Schleswig-Holstein, Koberg, Ziegler leg., 1984-08-02 (cWZ).

# Other material:

Finland, Ab: Perniö, 668:32 (Metsähallitus); Raisio, Linnavuori leg. (MZH); Sammatti, Krogerus leg. 1943, (MZH), N: Hyvinkää, 672:33, Rutanen leg., 1974-06-16, 1979-05-16, 1983-06-14, 1985-06-17, 1988-05-28, 1988-06-23, 1994-08-07 (cIR); Sipoo, 670:34, Rassi leg., 1988-05-30 (cPR); 670:34, Rutanen leg., 1987-06-07 (cIR); N: Pukkila, 672:33, Rutanen leg. (cIR); Ka: Vehkalahti, E. Helve leg., 671:35, 1968-06-22 (cEHe); St: Säkylä, Linnavuori leg., 1947 (MZH); Yläne, 674:32, 2006 (Metsähallitus); Ta: Heinola, 678:34, Kaila & Martikainen leg., 1992, Kuhmoinen, Helve leg., 683:33, 1990-06-09 (cEHe); Lammi, 677:33, Y. Kangas leg. (MZT); Lammi, 677:33, Mattila leg., 2007; Lempäälä, Hemdal leg. (ZMH); Loppi, 673:33, Karjalainen leg., 2005 (cSK); Loppi,



Figure 2. *Pentanota jani* **sp. n.**, head, dorsal view. Finland, Sa, Ristiina, male paratype. C = clypeus, F = frons, L = labrum.

Figur 2. *Pentanota jani* **sp. n.**, huvud, ovanifrån. Finland, Sa, Ristiina, paratyp, hane. C = clypeus, F = frons, L = labrum.

677:33, 2006 (Metsähallitus); Muurame, 689:34, Helve leg., 1975-07-01 (cEHe); Tampere, Saarinen leg., 1943-09-07 (MZH); Sa: Ristiina, Linnaniemi leg., one male, four females (MZH); Tb: Saarijärvi, Stockmann leg., 1943 (MZH); Saarijärvi, 697:34, Stenius leg. (MZH); Karstula, Pohjola leg., one male, three females (MZH); Sb: Vehmersalmi, Hemdal leg., two females (MZH); Kuopio, 697:35, Savolainen leg., 1994- 06-07...06-13 (KNZM); **Kb**: Ilomantsi, 699: 37, Similä leg., 2002-05...07, 08...10 (discarded); 699:37, Ilomantsi, 699:37, 2009-05-19...06-23 (cPM); Kesälahti, 688:36, Helve leg., 1985-07-09 (cEHe); Lieksa, 700:36, Hyvärinen leg., 2002-06...08 (cEHy); Lieksa, 702:36, Clayhills leg., 1994-06-05 (cTC); Helve leg., 1994-06-04 (cEHe); Om: Alajärvi, Lahtinen (=Lahtiperä) leg. (ZMH); Ok: Kuhmo,708:36, 1996-08-16 (cIR); Suomussalmi, 717: 36, 1994-07-06...07-12, Leinonen leg. (cIR); Oba: Pudasjärvi, 722:35, 2004-07...08, Pentinsaari leg. (cMP); Oba: Oulu, 2001-05-08, Pentinsaari leg. (cMP); Oba: Haukipudas, 2014-05-18, Pentinsaari leg. (MZO).

**Russia**, Karelia: Lipola, C. Lindqvist leg., 1943-10 (MZH).

Sweden, Västmanland: female, Ramqvist det.; Ångermanland: Rönnliden, Hallqvist leg., two males (BeetleBase 2022); Lule Lappmark: male and female, Ramqvist det. Further records can be seen on the Artdatabanken site (Artdatabanken 2022). **Norway**, AK: Røa (Strand, 1946); TE: Notodden, Olberg det. (Artsdatabanken 2022); HE: Rena, Ligaard det. (Artsdatabanken 2022).

#### Diagnosis

The combination of 5-5-5 tarsal pattern, caudad directed pronotal vestiture pattern, absence of visible frontal suture (Fig. 2), oval head without separate neck, large size and metatarsomere one being slightly longer than one and two combined (Fig. 3B) separate the genus *Pentanota* from other Scandinavian Aleocharinae. The apical part of the *Pentanota* median lobe capsule is quite unusual. The apex is strongly and narrowly constricted basally, giving an impression of a basally flexible apical section (Fig. 6). Another unusual feature in this genus is the extremely small female spermatheca (Fig. 8), this character state being a plesiomorphy in Oxypodini (Yamamoto, 2021; character 151).

The genus *Pentanota* can be identified with a key provided by the internet site "Käfer Europas" (Lompe 2022), based on Lohse's addition in "Die



Figure 3. *Pentanota jani* **sp. n.**, Finland, Ristiina, male paratype; – A) antenna; – B) metatarsus.

Figur 3. *Pentanota jani* **sp. n.**, Finland, Ristiina, paratyp, hane; – A) antenn; – B) metatarsus.

Käfer Mitteleuropas", volume 12 (Lohse 1989: 223). As Herman (Seevers 1978: 41) pointed out, *Pentanota* cannot be keyed out with Seevers' key since it lacks a visible frontal suture. This suture between frons and clypeus (Fig. 2) is present in all Staphylindae, but only some of them have it visibly present as a surface structure. In transparent permanent mounts it can be detected by the difference in surface structure between clypeus and frons. This is the case with *Pentanota* as well (Fig. 2). Genus *Pentanota* would key out as *Neothetalia* in Klimaszewski & Pelletier (2004), but it differs from that genus by the very different median lobe and spermatheca, shorter mesosternal keel and male secondary sexual characters.

*Pentanota jani* differs from the Siberian *P. meuseli* in having a median lobe that is smaller, less elongated, apically more curved, and much wider in dorsoventral view and with proportionally smaller internal sack features (Fig. 6 A,B) and a spermatheca which is simpler and much smaller (Fig. 8). Since only two specimens of *P. meuseli* are known to exist, it is difficult to pinpoint external characters separating these species. The small head of *P. jani* is distinctive, however, as the ratio width of pronotum/width of head is under 1.40 in *P. meuseli* (lectotype 1.37, paralectotype 1.38) and usually more than 1.50 in *P. jani*, the median being 1.52



Figure 4. *Pentanota jani* **sp. n.**, Finland, Ristiina, male paratype; – A) mentum and labium; – B) maxilla, ventral view.

Figur 4. *Pentanota jani* **sp. n**., Finland, Ristiina, paratyp, hane; – A) mentum och labium; – B) maxilla, ventral vy.

(1.47 to 1.61, n = 54). The decisive differences are in the genitalia of both sexes. Other putative diagnostic external characters are (1) the shorter last flagellomere in *P. jani*, (2) the slightly stronger teeth on the male sixth visible tergite in *P. jani* and (3) the smaller size of *P. meuseli*. Whether the specimen found in Poland belongs to the same species as the Fennoscandian and German ones cannot be definitely said, but it appears highly probable.

# Description

Body wide, head usually blackish, pronotum often slightly paler, elytra yellowish brown with darker areas around scutellum and at hind corners, these variably developed, abdomen usually darker than elytra, apically and along tergite margins paler, legs long, yellow, antennae mostly yellowish brown, but darker brownish ones are not rare (Fig. 1). Size 3.5 - 5 mm.

Head oval, proportionately small, "neck" about as wide as 2/3 of rest of head, eyes large, flattish, frontal suture not visible, mandibles moderately long, right one with small median tooth, anterior edge of labrum slightly concave (Fig. 2), labial palps elongate, with three segments, ligula elongate, apically split in two for about 1/3 of total length, without setae, mentum fairly narrow (Fig. 4A), maxillary palps with four segments, lacinia and galea of Oxypoda/Atheta type (Fig. 4B). Antennae with scape longer and thicker than pedicel, flagellomere one slightly shorter than pedicel, flagellomeres becoming stouter towards apex from there on, more so in females than males, flagellomere three already transverse in females, about as long as wide in males, flagellomere eight about 1.6 times as



Figure 5. *Pentanota jani* **sp. n.** Finland, Ristiina, male paratype, mesothorax, ventral view.

Figur 5. *Pentanota jani* **sp. n.** Finland, Ristiina, paratyp, hane, mesothorax, underifrån.

wide as long in females, variably more elongate in males, flagellomere nine elongate, longer than seven and eight combined, abruptly constricted about in middle giving an impression of an extra [12<sup>th</sup>] "segment" (Fig. 1, 3A). The variation in antennal structure is considerable and the antennomeres are oval in cross-section. Because of this, the antennae may look quite differently from each other, even in the same specimen.

Pronotum wide, narrower in front than at base, convex, ratio width of pronotum/width of head 1.47 - 1.61, median 1.52 (n= 56), hairs directed caudad, on basal half increasingly towards sides as well, punctation moderately dense, punctures sharp and clear.

Elytra wider and longer than pronotum, with rough, dense punctation, posterior margin sinuate at hind corners, these sharp. Mesosternal anterior margin with strong carinae (Fig. 5), with delicate keel on anterior third of its median length (Fig. 5), mesosternal process narrow, reaching two-thirds of mesocoxal length, isthmus short (Fig. 5).

Abdomen slightly narrowing towards apex, densely punctate, tergites three to six impressed basally, tergite seven with numerous small seedlike granules. Male tergite eight with granules, apically emarginate, corners with sharp tooth, in between these with five to six somewhat irregular smaller teeth, ventrite eight bisinuate, medially pointed. Female tergite eight shallowly emarginate, ventrite eight narrowly emarginate medially. Legs long, slender, tarsal scheme 5-5-5, metatarsomere one slightly longer than two and three combined (Fig. 3B).

## Remarks

The median lobe of the lectotype *P. meuseli* organ illustrated in Klimaszewski (2008) appeared to be broken close to apex (Fig. 6D). Because of this damage, the organs were compared by measuring them from base to the basal invagination of the apex. In ventral view, the ratio length/width is 1.30 for *P. jani*, 1.58 for *P. meuseli*. In addition to being larger, the median lobe is clearly more elongate in *P. meuseli* than in *P. jani*, this difference being evident in lateral view as well (Fig. 6). The sizes differ clearly, the length without the apex being 0.43 mm in *P. jani* and 0.52 mm in *P. meuseli* (Fig. 6). The apical section of the parameres of *P. jani* 

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Figure 6. *Pentanota* spp., median lobe; – A, B) dorsoventral view; – C, D) lateral view; – A, C) *P. jani* **sp. n.**, Finland, Ristiina, paratype; B, D. *P. meuseli* Bernhauer, Russia, Amur region, lectotype (after Klimaszewski 2008). The arrow in D indicates the apparent break of the organ's apex. Scale 0.2 mm.

Figur 6. *Pentanota* spp., median lob; – A, B) dorsoventral vy; – C, D) sidovy; – A, C) *P. jani* **sp. n.**, Finland, Ristiina, paratyp; B, D. *P. meuseli* Bernhauer, Ryssland, Amur-regionen, lektotyp (efter Klimaszewski 2008). Pilen i D indikerar brottet på organets spets. Skala: 0,2 mm.

is proportionately distinctly shorter than that of *P. meuseli* (Fig. 7).

*Pentanota jani* has a very small spermatheca, greatest width of the rounded apex being 0.07 mm. The organ of *P. meuseli* is about twice as big, apex being slightly compressed, not round and considerably larger, greatest width being 0.15 mm (Fig. 8). The origin of Lohse's illustration (fig. 8 A) remains unknown, but it is clearly based on *P. jani* **sp. n.** 

Sawada (1988) described another *Pentanota* species from the Palaearctic region, *P. alpicola* from Japan. The description included detailed descriptions of mouthparts, the median lobe, parameres and the spermatheca. The median lobe lacked the peculiar lateral invagination at the base of the apex found in both *Pentanota meuseli* and *P. jani*, parameres were compact and spermatheca was well developed, not rudimentary as in *Pentanota*. On the basis of these features, it is clear that *P. alpicola* does not belong in *Pentanota*. Using Klimaszewski & Pelletier's key for Nearctic *Ocalea* group genera (2004), *P. alpicola* keys to *Neothetalia*. Since the spermatheca appeared to best fit with that of some

of the other genera described in Klimaszewski & Pelletier (2004), a comparative study is needed to clarify the generic status of this species. It is provisionally placed in *Neothetalia* as *Neothetalia alpicola* (Sawada), new combination.

## Ecology and distribution of Pentanota jani

Altogether, some fifty separate finds of *P. jani* are known from Finland, amounting to about seventy specimens. Besides location and collector, no further information was available for 13 of these. Reported passive trapping methods were: freehanging window-traps (14), trunk-window traps (4), window-traps baited with freshly cut pine (2), moth bait trap (1) and yellow pan trap (1). Active collecting methods known were: car-net (8), sweeping-net (6) and sieve (5). In the Pyhä-Häkki old growth forest region in Central Finland, P. *jani* has been found repeatedly by sieving litter or fallen bark under dead or fresh Scots pines (Pinus sylvestris) (Stockmann, Mattila, Stenius) and it has been found in other locations by the same method as well (Clayhills). Several window-trap

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Figure 7. *Pentanota* spp, parameres; – A, B) *P. jani* **sp. n.**, Finland, Ristiina, paratype; – C) *P. meuseli* Bernhauer, Russia, Amur region, lectotype (after Klimaszewski 2008). Not in scale.

Figur 7. *Pentanota* spp, paramerer; – A, B) *P. jani* **sp. n.**, Finland, Ristiina, paratyp; – C) *P. meuseli* Bernhauer, Ryssland, Amurregionen, lektotyp (efter Klimaszewski 2008). Inte i skala.

sites were in pine dominated forests, also after forest fires, but spruce dominated locations have produced the species twice as well (Leinonen, Rutanen). Birch is mentioned a few times: beaten from branches (Rassi), on bracket-fungus growing on rotten birch (Martikainen) and sitting by a Cossus tunnel on birch in the evening (Saarinen). The holotype and several paratypes were collected from evening flight (swarming?) in a garden of a suburban home (Söderman) and once P. jani was swept from vegetation close to a pile of cut pines (Helve). Several paratypes from Kuusamo were caught with large window traps baited with freshly cut pine and spruce (Muona). Pentanota jani has been caught with window traps placed on freshly cut spruce in Sweden as well (Artdatabanken 2022). In Norway, *P. jani* has been caught by a pit-fall trap in a pine forest (Olberg). It appears clear that P. jani favors coniferous trees and very likely pine. The mouthparts clearly indicate that P. jani is a predator and its close connection with freshly cut coniferous trees suggests it preys on bark beetles. An actual observation supporting this exists, since it has been found in the mother gallery of Tomicus piniperda (L.) in Scots pine in Sweden (Artdatabanken 2022).

*Pentanota jani* is widespread in Finland and Sweden, but rare and restricted in the southwest of Norway. This distributional pattern fits well with the immigration history of spruce in Scandinavia as described by Giesecke & Bennett (2004). The southwest of Norway was one of the last regions spruce is assumed to have reached after the Ice Age. However, the same distributional pattern would emerge from a more recent invasion at a later date as well and the Scots pine has a much longer history in the same area.

If, as it seems, P. jani is a predator targeting recently damaged conifers in search of scolytids, it may be a pyrophilic species as well. Several Finnish records relate to regions with recently burnt forests in eastern Finland. The distribution of the collecting dates can be seen as supporting this. Even though mass collecting with traps in forest regions produced large numbers of beetles during the period 1981-2009, the median year of all separate Finnish P. jani observations is 1985. Many records are old and from the period when collecting activity was lower than in the 1990's, flight intercept traps were rarely used and forest fires were more common. Pentanot jani sp. n. (as *P. meuseli*) is classified as a threatened species in Sweden (VU). In Finland it is classified as a lower risk species (NT), but considering the collecting data and the limited distribution, this should be reconsidered.

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The Finnish Coleoptera Expert Group members as well as friends on the BeetleBase discussion forum offered helpful information. Members of the Söderman family kindly identified the location of the region where H. Söderman used to collect beetles. Dr. Harald Schillhammer (Naturhistorisches



Figure 8. *Pentanota* spp., spermatheca; – A. *P. meuseli* sensu Lohse, locality not known (after Lohse 1989); – B) *P. jani* **sp. n.** Finland, Kuusamo, paratype; – C) *P. meuseli* Bernhauer, Russia, southwest of Baikal, paralectotype (after Klimaszewski 2008). Scale: 0.2 mm.

Figur 8. *Pentanota* spp., spermatheca; – A. *P. meuseli* sensu Lohse, ort okänd (efter Lohse 1989); – B) *P. jani* **sp. n.** Finland, Kuusamo, paratyp; – C) *P. meuseli* Bernhauer, Ryssland, sydväst om Baikal, paralektotyp (efter Klimaszewski 2008). Skala: 0,2 mm.

Museum Wien) sent measurements of the female paralectotype of *P. meuseli*. Wolfgang Ziegler provided a digital image of a German specimen from his collection. My sincere thanks to all of them.

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# Svensk sammanfattning

Pentanota jani **sp. n.** (Coleoptera, Staphylinidae, Aleocharinae, Oxypodini) beskrivs från Finland. Tidigare förväxlad med den sibiriska *Pentanota meuseli* Bernhauer och rapporterad under detta namn, är den utbredd i Finland och Sverige, och finns även i ryska Karelen, Norge och Tyskland. De senaste uppgifterna om *Pentanota meuseli* från Polen hänvisar mycket troligt också till *Pentanota jani. Pentanota alpicola* Sawada har visat sig inte höra hemma i *Pentanota* Bernhauer och den betraktas preliminärt som *Neothetalia alpicola* (Sawada), **ny kombination**.