

A revision of a *Platycerus* fossil (Coleoptera : Lucanidae)
from the Late Pleistocene Nojiri-ko Formation

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後期更新世のルリクワガタ属の化石の再検討

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抄録：1985年に野尻湖の第4回陸上発掘において産出し、当時ルリクワガタ?の前胸背板と
同定された後期更新世の化石の発見は、ルリクワガタ属としては日本で初めてであり、世界でも数
例しか知られていないことから貴重な成果である。その発見から後、本属の分類と生態に関する
資料が蓄積されたので、今回詳細な再記載と再検討を行ったところ、コルリクワガタの原名亜種
と判明した。

Abstract : An insect fossil of Late Pleistocene yielded at the 4th Hill Site
Excavation by Nojiri-ko Excavation Research Group in 1985, and it was identified
as a male pronotum of *Platycerus delicatulus* LEWIS(?) at that time. It is valuable
that a *Platycerus* fossil was discovered in Japan for the first time. The detailed
redescription and the comparison with later collected materials made it clear
that the fossil should be identified as *Platycerus acuticollis acuticollis* Y.
KUROSAWA.

Key words : *Platycerus*; Insect fossil; Nojiri-ko Formation; Late Pleistocene;
Revision.

Introduction

At the 4th Hill Site Excavation in 1985 yielded an insect fossil which was distinctly
considered as a male pronotum of the *Platycerus* species (Fossil Insect Research Group
for Nojiri-ko Excavation, 1987). The first discovery of a *Platycerus* fossil in Japan is
valuable because a few cases were hitherto informed of from all over the world. Although
it was then identified as *Platycerus delicatulus* LEWIS(?), a re-examination has been
required after our collecting an adequate number of specimens of the genus. We, also
the members of the above-mentioned group, have been interested in morphology, ecology
and biogeography of the genus, and have continued investigating them for these several
years. Subspecies of *P. acuticollis* recently described were all collected, and specimens
of *Platycerus caprea*, *P. caraboides*, *P. hongwonpyoi*, *P. marginalis*, *P. oregonensis*,
and *Platyceropsis keeni* became available for study.

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Based on thus many materials collected, two works have been planned and conducted in parallel. The first one is to offer hypotheses on speciation of the genus *Platycerus* in Japan on the basis of the morphology and the geographical distribution patterns of the recent species (in preparing). We should like to set our sights on testing the hypotheses by fossils of the group occurring in many localities. The second is to identify the pronotum fossil of *Platycerus* species correctly by the detailed redescription and the comparison in this paper, which have been a primary purpose.

We must express our sincere thanks to the followings for their kind favor respectively: Nojiri-ko Excavation Research Group, Nojiri-ko Museum and Fossil Insect Research Group for Nojiri-ko Excavation which allowed us to examine the fossil materials; the Osaka Museum of Natural History (OMNH) which always affords us to use the equipments and to examine the collection reserved there; Mr. Yorio MIYATAKE of OMNH who advised us on our study; Messrs. Hiroshi FUJITA, Keitarô HARUSAWA, Yoshitaka KANADA, Kôjiro KATSURA, Hironao KINUGASA, Tetsurô MIZUNUMA, Takashi MURAI, Shûhei NOMURA, Teruo OCHI, Toshihisa SAITÔ, Masaomi SAKURAI, Motohiko TANIKADO, Mitsuru TOMITORI, Tsuyoshi YAGI, Hisanobu YAMASHITA, and Shigeto YAMAYA who agreeably loaned, or presented us valuable materials, or literature, or else labored to get them; Mr. Masaki EGÔ who informed us of the early conditions of the fossil.

Geologic note

From the Lower Nojiri-ko Member III at the Ikejiri-gawa Hollow, Shinano-machi, Nagano Prefecture the fossil of pronotum (85IK-a-I-19, i-1000) was obtained in the 4th Hill Site Excavation of Nojiri-ko in 1985 (Fig. 1). After Geology Research Group for Nojiri-ko Excavation (1987), the age of the deposit including the fossil was presumed to be 37,000 to 30,000 Y.B.P. This period belonged to the Last Glacial, though it was before the coldest age that was considered to be about 18,000 Y.B.P., and it seems to have been a little cooler in those days than in the present time. As mentioned before, the fossil was evidently thought to be a male pronotum of the *Platycerus* species from the morphological characters, and was then identified as *P. delicatulus*(?). In either case, the occurrence of the genus *Platycerus* species of Japan suggests that the paleoenvironment there in that period should have been of the forest consisting of deciduous broadleaf trees in the cool-temperate zone, though we are

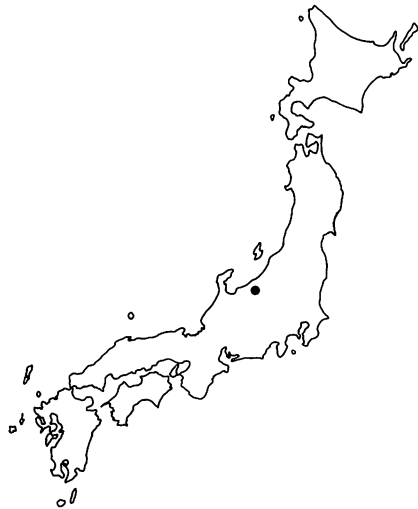


Fig. 1. Location of the Lake Nojiri-ko where the *Platycerus* fossil was discovered.

not familiar with foreign species.

It turned out later that the character states on the description of the fossil was not consistent with those of *P. delicatulus*, particularly in the shape of posterior angles.

Redescription

(Fig. 2)

Further description of it is as follows: Pronotum 1) deep metallic blue or bluish violet, 2) widest apparently before the middle, precisely at two-thirds from the base; 3) anterior angle not projecting as that of *P. sugitai*; 4) lateral margin depressed strongly from the anterior to posterior angle, reflex along edge; 5) carina on the lateral edge remarkable, notched with foveae losing setae; 6) the posterior angle in question somewhat laterally projecting and angulate. Length: 2.4mm; width: 3.1mm.

Comparison

(Fig. 3)

Probability of *P. delicatulus* or *P. kawadai* is rejected on the item 4), 5), and 6), i.e., they not only have rounder and duller posterior angles, but also have smoother and less depressed lateral margins than the others have. *P. sugitai* is also excluded on account of the item 2) and 3), because the species *P. sugitai* does not conform in these items, so the fact is that the fossil is concluded to be one of subspecies of *P. acuticollis*.

Moreover, the fossil is neither of *P. acuticollis namedai*, nor of *P. a. akitai* at the subspecific level on account of the item 2) and 5), because their pronotum is widest at about the middle and the sculpture of the lateral margins is relatively smoother, they being additionally not so large in size as the fossil. The last alternative ways, whether *P. a. acuticollis* or *P. a. takakuwai*, are restricted to *P. a. acuticollis* on the item 1) and 2). Possibilities of other foreign species are obviously negated anyway through processes mentioned above. This conclusion corresponds to the location of the present distributions of each subspecies and to the paleoclimate and the paleoenvironment which were presumed above.

Specimens Examined

Japanese species

Platycerus delicatulus delicatulus LEWIS, 1883:

[Iwate pref.] 1 ♀, Matsuo, 3. viii. 1936, K. SEKI leg. [Gifu Pref.] 1 ♂ 1 ♀, Mt. Haku-san, 18-19. x. 1986, T. SAITO leg. (Fig. 3c). [Hyôgo Pref.] 1 ♀, Onzui Forest, Shiso-gun, 25. v. 1958, I. HIURA leg. [Nara Pref.] 1 ♀, Mt. Odaigahara, Kami-kitayama-mura, 24. v. 1970,

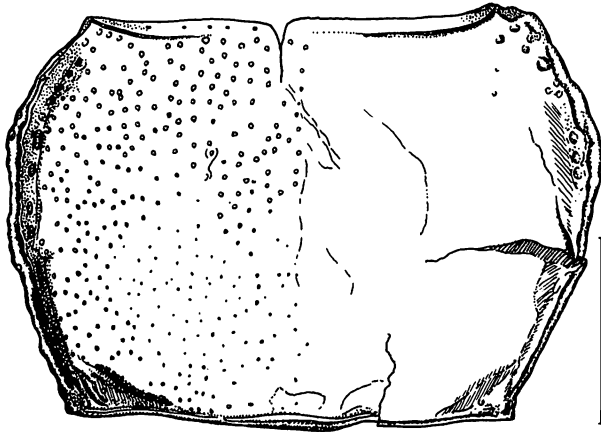


Fig. 2. The fossil of pronotum of *Platycerus acuticollis acuticollis* obtained from the Lower Nojiriko Member III at the Ikejiri-gawa Hollow, Nagano Prefecture in the 4th Hill Site Excavation of Nojiriko. Scale: 1mm.

O. TOMINAGA leg.; 3 ♀, Mt. Wasamata, 1. xii. 1986, I. KANAZAWA leg.; 1 ♀, same locality and date, alt. 1240m, M. OHTSUKI leg. [Tokushima Pref.] 1 ♂ (bred), Minokoshi, Mt. Tsurugi, Higashi-iyayama-mura, alt. 1300-1400m, 20. iii. 1988 (larva), I. KANAZAWA leg.; 1 ♂, Mt. Akaboshi, Higashi-iyayama-mura, alt. 1250m, 20. iii. 1988, M. OHTSUKI leg.; 2 ♂ 3 ♀, Dosutôge Mt. Kumoso, alt. 1200m, 21. iii. 1988, H. YAMASHITA leg.; 1 ♂ 1 ♀, same locality, alt. 1050m, same date, H. YAMASHITA leg.

P. delicatulus unzendakensis FUJITA et ICHIKAWA, 1982:

[Nagasaki Pref.] 1 ♂ 1 ♀, Mt. Unzen, 31. xii. 1984, S. KOGATA leg.

P. acuticollis acuticollis Y. KUROSAWA, 1969:

[Niigata Pref.] 1 ♂ 1 ♀, Mt. Kurokura, Itakura-chô, Naka-kubiki-gun, alt. 1100m, 31. v. 1987, Y. KANADA leg. (Fig. 3B); 10 ♂ 5 ♀, Mt. Kurokura, Itakura-chô, Naka-kubiki-gun, alt. 1300m, 6. vi. 1988, Y. KANADA leg.; 1 ♂, Mt. Kurokura, Itakura-chô, Naka-kubiki-gun, 27. v. 1989, K. SUMITANI leg.

P. acuticollis takakuwai FUJITA, 1987:

[Kanagawa Pref.] 1 ♂, Dôtaira, Mt. Tanzawa~Tennôji-one, alt. 1320m, 4. v. 1988, I. KANAZAWA leg.; 2 ♂ 1 ♀ (bred), same locality, alt. 1160m, 4. v. 1988 (larvae), I. KANAZAWA leg. [Shizuoka Pref.] 2 ♂ 2 ♀, Mt. Manjirô, alt. 1000m, 3. v. 1988, I. KANAZAWA leg.; 3 ♂ 7 ♀ (bred), same locality, alt. 1000m, 3. v. 1988 (larvae), I. KANAZAWA leg.; 1 ♂ 1 ♀, same locality, 3. v. 1988, M. OHTSUKI leg. [Gifu Pref.] 1 ♂, Mt. Haku-san, 18-19. x. 1986, T. SAITO leg.

P. acuticollis akitai FUJITA, 1987:

[Nara Pref.] 1 ♂, Mt. Kongô, 29. xi. 1987, T. YAGI leg.; 2 ♀, near Ichinotorii, Mt. Kongô, alt. 1070m, same date, M. OHTSUKI leg.; 1 ♂ 1 ♀, Mt. Kongô, 21. v. 1988, M. SAKURAI leg.; 1 ♂ (bred), Mt. Kongô, 16. x. 1988 (larva), I. KANAZAWA leg.; 4 ♂ (bred), Kotsubo-tani, Gyôjagaeri-rindô~Misen-tozandô, Kami-kitayama-mura, alt. 1150m, 6. ix. 1987 (larvae), M. OHTSUKI leg.; 1 ♀, Ichinotorii, Mt. Kongô, Gose, 5. xi. 1989, H.

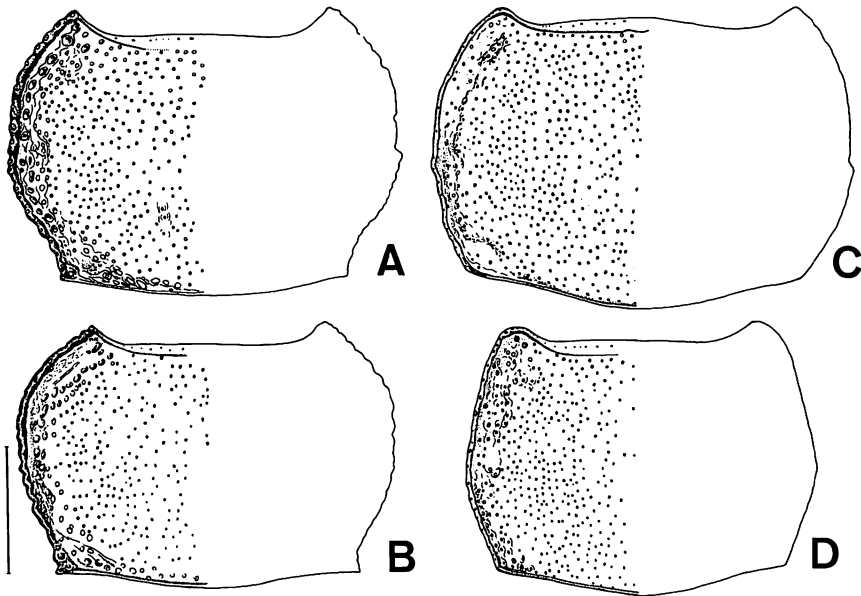


Fig. 3. Male pronota of the Japanese *Platycerus* species in dorsal view.

A : *P. sugitai*, B : *P. acuticollis*, C : *P. delicatulus*, D : *P. kawadai*. Scale: 1mm.

YAMASHITA leg. [Osaka Pref.] 1 ♀ (bred), Mt. Kongô, 15. ix. 1982 (pupa), T. SAITO leg. [Hyôgo Pref.] 1 ♀ (bred), Kozukko, Mt. Ôgino-sen, Onsen-chô, Mikata-gun, alt. 1000m, 3. vi. 1984, M. TANIKADO leg.; 1 ♂ Mt. Ôginosen, 1987, M. TANIKADO leg. [Wakayama Pref.] Mt. Gomanodan, 5. v. 1984, T. SAITO leg.; [Tottori Pref.] 1 ♂, Mt. Hyônosen, Wakazakura-chô, Yazu-gun, 27. v. 1984, H. KINUGASA leg.; 1 ♂ (bred), Mt. Dai-sen, 23. vii. 1984 (larva), T. SAITO leg.; 5 ♂ 1 ♀, Ôginosen-tozanguchi, Himeji, Koge-chô, Yazu-gun, alt. 950m, 10. v. 1987, H. KINUGASA leg.

P. acuticollis namedai FUJITA, 1987:

[Tokushima Pref.] 1 ♂ 1 ♀, Dosu-tôge, Mt. Kumosô, alt. 1000m, 21. iii. 1988, M. OHTSUKI leg.; 1 ♂, same data, H. YAMASHITA leg.; 2 ♂ (bred), same locality, alt. 1200m, 21. iii. 1988 (larvae), I. KANAZAWA leg.; 1 ♀ (bred), Mt. Akaboshi, alt. 1200-1300m, 20. iii. 1988 (larva), I. KANAZAWA leg. [Oita Pref.] 1 ♀ (bred), near the top of Mt. Sobo, 9. x. 1988 (larva), T. MURAI leg.

P. kawadai FUJITA et ICHIKAWA, 1982:

[Yamanashi Pref.] 1 ♂ 1 ♀, Otome-kôgen, 3. ix. 1984, H. SHIRASU leg. (Fig. 3D).

P. sugitai OKUDA et FUJITA, 1987:

[Nara Pref.] 1 ♂, Mt. Odaigahara, Kami-kitayama-mura, 20. xi. 1983, T. SAITO leg.; 1 ♂ 1 ♀, same locality, 4. xi. 1984, T. SAITO leg.; 1 ♀, same locality, 28. iv. 1984, T. SAITO leg.; 2 ♂ 1 ♀, same locality, alt. 1500m, 29. iv. 1987, M. OHTSUKI leg. (Fig. 3A). [Tokushima Pref.] 1 ♀, Minokoshi, Mt. Turugi, alt. 1350m, 20. iii. 1988, M. OHTSUKI leg.; 1 ♂, same data, I. KANAZAWA leg.; 2 ♂ 1 ♀, Mt. Kumosô, alt. 1150m, 21. iii. 1988, M. OHTSUKI leg. [Kochi Pref.] 1 ♀, Tengu-kôgen, Higashi-tsuno-mura, 21. v. 1980, A. ISHIDA leg.

Foreign species

Platycerus hongwonpyoi IMURA et CHOE, 1989:

[Korea] 1 ♂ 1 ♀, Jirisan, v. 1987; 1 ♂, Sobaeksan, v. 1987.

P. caraboides (LINNAEUS), 1758:

[U.S.S.R.] 2 ♀, Krasnoyarsk, 25. vi. 1969, PATRUSHEVA leg.

[Yugoslavia] Tarnova, 2. vi. 1983. [Austria] 4 ♂, Wien, v. 1984. [Czechoslovakia] Bohemia, Zbraslav-Závist, 17. v. 1972, P. ČERMÁK leg.

P. caprea DEGEER, 1774:

[Yugoslavia] 1 ♂, Tarnova, 2. vi. 1983. 1 ♂ 1 ♀, Mt. Javornik, Postojna, 25. iv. 1978.

[Italy] 1 ♂ 1 ♀, Musi Udine, 27. iv. 1982. 4 ♂, Trieste, 30. x. 1983. [Czechoslovakia] 1 ♀, Bohemia, Hlubocěpy, v. 1952, RÁKOSNÍK leg. [Finland] 1 ♂, Polbana, 5. vii. 1923, Von. F. SUENSON leg. [France] Le. Liolau, 13. v. 1980.

[Unknown] Mt. Krim., Lubiaua, Yngosp., alt. 1000m-1100m, 3. xi. 1967, Ceppi-Battoni.

P. marginalis CASEY, 1897:

[U.S.A.] 1 ♂, Foster Meadow, El Dolado County, California, 13. vi. 1986, L. G. BEZARK leg.; 1 ♂, same locality, 20. vi. 1986, L. G. BEZARK leg.

P. oregonensis WESTWOOD, 1846:

[U.S.A.] 1 ♂ 1 ♀, Alameda County?, California, v. 1972.

Platyceropsis keeni (CASEY), 1895:

[U.S.A.] 1 ♂, Walo Poat, Lincoln, Oregon, iv; 1975. 1 ♂, uncertain data.

Literature Cited

- BENESH, B., 1946. A Systematic Revision of the Holarctic Genus *Platycerus* GOFFROY. Trans. Amer. Ent. Soc, LXXII : 139-202, pls. IV-IX. The Academy of Natural Science, Philadelphia.
- Fossil Insect Research Group for Nojiriko Excavation ed., 1987. Fossil insects obtained from the Nojiri-ko Formation in the 9th Nojiri-ko Excavation and the 4th Hill Site Excavation. The Lake Nojiri Excavation 4 (1984-1986) : 125-136. Assoc. Geol. Collab, Tokyo.
- FUJITA, H., 1987. Revisional studies on geographical variations of *Platycerus acuticollis* Y. KUROSAWA and *Ceruchus lignarius* LEWIS. Gekkan-Mushi (A monthly Journal of Entomology), (197) : 3-7. Mushi-sha, Tokyo.
- FUJITA, H. & T. ICHIKAWA, 1982. A new species of the genus *Platycerus* GEOFFROY from central Japan, a new subspecies *Platycerus delicatulus* LEWIS from Shimabara Peninsula. Elytra, 10(1) : 1-10. Tokyo.
- OKUDA, N. & H. FUJITA, 1987. A new species of the Genus *Platycerus* GEOFFROY from Southwest Japan. Gekkan-Mushi (A monthly Journal of Entomology), (192) : 3-13. Mushi-sha, Tokyo.
- WHALLEY, Paul ed., 1989. Coleoptera 1 *Platycerus caraboides*. Insects, a comprehensive illustrated guide to insects of Britain and Europe. The Hamlyn Publishing Group Ltd., London, 266p.