

A Note on the Japanese *Dioedus* (Coleoptera, Tenebrionidae), with a New Synonymy

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Abstract The taxonomic positions of the Japanese species of the genus *Dioedus* are discussed. *Dioedus tokaranus* (NAKANE, 1963) is synonymised with *D. miyakensis* (NAKANE, 1963).

Introduction

The Japanese species of the genus *Dioedus* LECONTE, 1862 has been known only two species — *D. miyakensis* (NAKANE, 1963) and *D. tokaranus* (NAKANE, 1963). These species were described under the genus *Tagalus* GEBIEN, 1914 based on a single specimen from Miyake-jima Island of the Izu Islands and Nakanoshima Island of the Tokara Islands, respectively. However, the independence of the two species have been confused because they are closely resemble each other, and the diagnostic characteristics defined by NAKANE (1963) are variable among individuals and localities. In addition, NAKANE (1963) suggested that the holotype of *D. tokaranus* is “somewhat anomalous example”. This unusual specimen makes it more difficult to understand the species.

Herein, I therefore discuss their taxonomic positions of these two species on the basis of analysis of the variation on the diagnostic characters mainly described in the paper of NAKANE (1963).

This study was made based on the two holotypes of *D. miyakensis* and *D. tokaranus*, and also 278 specimens collected from various localities.

Dioedus miyakensis (NAKANE, 1963)

(Figs. 1–4)

Tagalus miyakensis NAKANE, 1963: 27 (Type locality: Tairo-ike, Miyake-jima Is.).

Tagalus tokaranus NAKANE, 1963: 28 (Type locality: Nakanoshima, Tokara Is.). *Syn. nov.*

Dioedus miyakensis: LÖBL *et al.*, 2008: 120.

Dioedus tokaranus: LÖBL *et al.*, 2008: 120.

Type material examined. Holotype of *Tagalus miyakensis* NAKANE, 1963: HOLOTYPE (Printed by black ink on red square label) / (Near Tairo-ike,) Is. Miyake, Japan (June, 9th. 1959) Coll; Y. Watanabe (Printed by black ink on white square label) / N – 5 (Handwriting by black ink on the ventral side of white square label) / *Tagalus miyakensis* Nakane (Handwriting by black ink) Det. T. Nakane, 1963 (Printed by black ink except for the handwriting “63” on Pink square label) / NAKANE Coll. SEHU JAPAN 1999 (Printed by black ink on square light green label with black frame). Holotype of *Tagalus tokaranus* Nakane, 1963: HOLOTYPE (Printed by black ink on red square label) / TOKARA Is. Nakanoshima 9. IV. 1953 (Printed by black ink on white square label) / *Tagalus tokaranus* Nakane (Handwriting by black ink) Det. T. Nakane, 1963 (Printed by black ink except for the handwriting “63”) (Pink square label) / NAKANE Coll. SEHU JAPAN 1999 (Printed by black ink on square light green label with black frame).

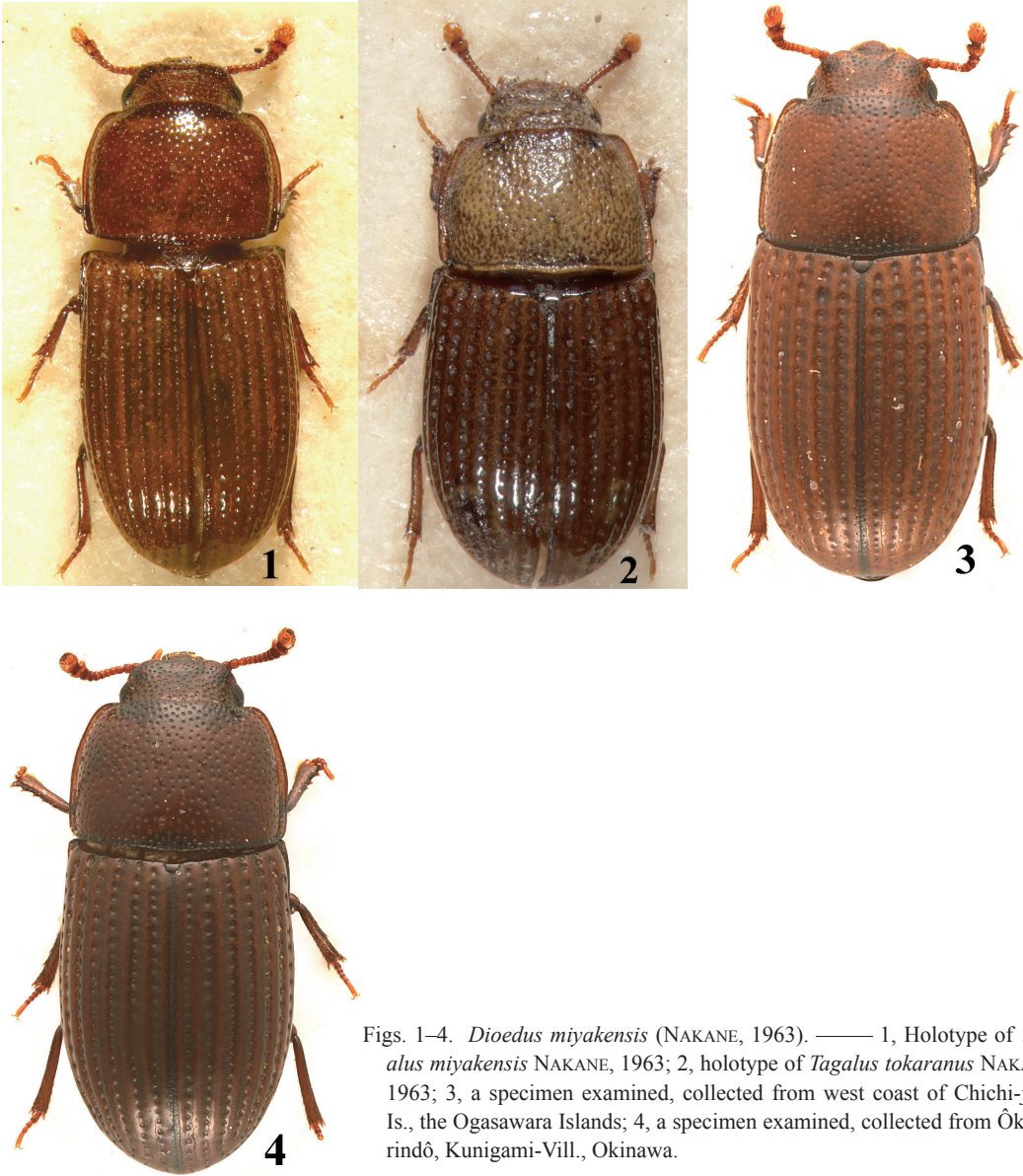
Other material examined. [Miyake-jima Is.] 13 exs., [IZ29] Tsubota-rindô, N34 03.879 E139 31.859, ca. 264 m, 12.II.2013, H. YOSHITOMI leg. [Kyushu] 2 exs., Takatoriyama, Fukuoka Pref., 10.V.1962, A. HAGA leg.; 6 exs., Mt. Inao-dake, Sugiyamadani Vall., Kimotsuki-chô, Kagoshima Pref., H. MIYATA leg. [Tsushima Isls.] 6 exs. Tsutsu, 5.V.1978, A. ODA leg. [Tokara Isls.] 4 exs., Nakano-shima Is., 24.V.1962, M. SATÔ leg.; 1 ex., same locality, 27.V.1962, M. SATÔ leg.; 1 ex., same locality, 23.VI.2002, S. YOSHIMICHI leg. [Amami-Ôshima Is.] 1 ex., Hatsuno, 2.IV.1966, H. NOMURA leg.; 10 exs., Suko, Uken Vil., 21.II.2002, Y. KAMITE leg.; 1 ex., Chuô-Rindô, Yamato Vil., 18.II.2002, Y. KAMITE leg.; 1 ex., Kachiura, 18.VI.2001, N. OHBAYASHI leg.; 4 exs., Chuô-Rindô, Naze-koshuku, 13.II.2009, H. MIYATA leg. [Yoro-jima Is.] 22 exs., Yoro-jima, Setouchi-machi, 25.II.2012, H. MIYATA leg.; 2 exs., Mt. Ôkachi-yama, Kagoshima, Japan, 7.V.2009, R. OGAWA leg. [Ishigaki-jima Is.] 1 ex., Mt. Omoto, 5 to 9.IV.1974, T. KINOSHITA leg.; 1 ex., same locality, 18.VII.1963, Y. HAMA leg.; 1 ex., same locality, 27.VI.1964, Y. HAMA leg.; 1 ex., same locality, 30.VI.1964, Y. HAMA leg.; 1 ex., same locality, 16.II.1974, S. IMASAKA leg.; 2 exs., Yoshihara, 25.III.2000, T. KURIHARA leg.; 2 exs., Nosoko-rindô, 5.III.2002, T. KURIHARA leg.; 2 exs., Ôtake, 18.III.1999, T. KURIHARA leg.; 5 exs., Urasoko, 31.I.2003, T. NAKATA leg.; 2 exs., Mt. Nosokodake, 26.X.2008, H. MIYATA leg. [Iriomote-jima Is.] 1 ex., Sonai, 9.X.1963, K. MORIMOTO leg.; 1 ex., Riv. Aira, 29.IV.2003, T. KURIHARA leg.; 13 exs., same locality, 25.X.1999, S. INADA leg. [Okinawa Is.] 23 exs., Ôkuni-rindô, alt. ca. 300 m, Kunigami Vill., 5.II.2009, T. KURIHARA leg.; 1 ex., Anai, Higashi Vill., 5.XI.1999, S. INADA leg.; 21 exs., Kenken, Motobu-machi, Kunigami-gun, 9.X.2000, S. INADA leg. [Ogasawara Isls.]; 7 exs., Mt. Tsutsuji-yama, Chichi-jima Is., 28.VII.1996, T. KISHIMOTO leg.; 1 ex., Tatsumidaira, Chichi-jima Is., cc-3, litter, 24.I.1997, T. KISHIMOTO leg.; 5 exs., West coast, Chichi-jima Is., 30.VII.1996, T. MATSUMOTO leg.; 2 exs., Chichi-jima Is., 25.VII.1992, K. ISHIDA leg.; 29 exs., Chibusa-yama, Haha-jima Is., 17.II.1989, M. ITOH leg.; 7 exs., same locality, Haha-jima Is., 1.II.1997, T. MATSUMOTO leg.; 1 ex., Mt. Kuwanoki-yama, Haha-jima Is., 4.VII.1997, T. MATSUMOTO leg.; 6 exs., same locality, 24 to 26.XII.2006, K. NAKANO leg.; 1 ex., Sekimon, Haha-jima Is., 3.VII.1997, T. KISHIMOTO leg.; 7 exs., same locality, 5.VII.1997, T. KISHIMOTO leg.; 1 ex., Sakaigatake to Sekinon, Haha-jima Is., 3.VII.1997, T. MATSUMOTO leg.; 1 ex., Haha-jima Is., 12.VIII.2002, S. YOSHIMICHI leg.; 1 ex., Koumoridani, Haha-jima Is., 4.VII.1997, T. MATSUMOTO leg.; 2 exs., near Ichinotani, Otôto-jima Is., 27.IV.1997, T. KISHIMOTO leg.; 2 exs., near Mt. Tenkai-zan, Otôto-jima Is., 27.IV.1997, T. KISHIMOTO leg. (by tullgren); 13 exs., near Mt. Tenkaizan, Otôto-jima Is., 9.VII.1997, T. KISHIMOTO leg. (by tullgren); 11 exs., Ainosawa, Otôto-jima Is., 9.VII.1997, T. KISHIMOTO leg. (by tullgren); 19 exs., Otôto-jima Is., 28.I.1997, T. MATSUMOTO leg.; 10 exs., same locality, 3.II.1997, T. MATSUMOTO leg.

Distribution. Japan (Kyushu*; Tsushima Island.*; Izu Islands: Miyake-jima Is.; Ogasawara Islands: Chichi-jima Is., Haha-jima Is. and Otôto-jima Is.*; Ôsumi Islands: Yakushima Is.; Tokara Islands: Nakanoshima Is.; Amami Islands: Amami-Ôshima Is. and Yoro-jima Is.*; Okinawa-jima Is.; Sakishima Islands: Ishigaki-jima Is. and Iriomote-jima Is. The areas with asterisk are new localities.

Discussion

According to the original description (NAKANE, 1963) and my examination on the holotypes, eight important diagnostic structures between both species are recognised. On the basis of the examination on two holotypes and 278 specimens listed in above, however, those characteristics are variable among individuals and/or localities as mentioned in the followings.

1. *Head with punctures rather large in the miyakensis, but rather small in the tokaranus*



Figs. 1–4. *Dioedus miyakensis* (NAKANE, 1963). — 1, Holotype of *Tagalus miyakensis* NAKANE, 1963; 2, holotype of *Tagalus tokaranus* NAKANE, 1963; 3, a specimen examined, collected from west coast of Chichi-jima Is., the Ogasawara Islands; 4, a specimen examined, collected from Ôkuni-rindô, Kunigami-Vill., Okinawa.

The punctures of the dominant species are rather large (= corresponding to *miyakensis* sensu NAKANE (1963)), but only a single specimen from Miyake-jima Island and three from the Ogasawara Islands are different in having fine punctures, and just one specimen (type of the *tokaranus*) has small punctures in the Tokara Islands.

2. Pronotum rather coarsely but not so closely punctate in the *miyakensis*, but rugosely in the *tokaranus*

Most of specimens are coarsely, but not closely punctate (= fit well with the *miyakensis* form). The anomalous specimens from Amami-Ôshima Island (1 ex.), Tokara Nakanoshima Island (1 ex. =

type of the *tokaranus*), Okinawa Island (3 exs.) and the Ogasawara Islands (6 exs.) however have rugosely punctate pronotum (= the *tokaranus* form). A few specimens from Kyushu (3 exs.), Yoro-jima Island (2 exs.), Ishigaki-jima Island (3 exs.) and the Ogasawara Islands (1 ex.) are rather simply and finely punctate. Two specimens from Miyake-jima Island have closely punctate pronotum.

3. *Strial punctures of elytra large and deep in the miyakensis, but extremely large and deep in the tokaranus*

This characteristic is very variable among the localities and individuals. The size of punctures has an inclination to be larger from the northeastern populations to the southwestern ones, though two different characteristics, "large" (= the *miyakensis* form) and "extremely large" (= the *tokaranus* form), are coexist partly in each population.

4. *Elytral striae obsolete at apical portion and the intervals not convex in the miyakensis, but not obsolete in apical portion and the intervals weakly convex in the tokaranus*

This characteristic is quite variable individually except for the population of Tsushima Islands, of which all shows the *miyakensis* form.

5. *Pronotum very slightly narrowed posteriorly in the miyakensis, not narrowed posteriorly in the tokaranus*

The *miyakensis* form is predominant in the population of Miyake-jima Island, Kyushu, Yoro-jima Island and Amami-Ôshima Island, but the *tokaranus* form is dominant in the remaining localities, especially, Nakanoshima Island of the Tokara Islands and Ishigaki-jima Island. Both characteristics are mingled in the population of the Ogasawara Islands of which 86 exs. (68 %) are the *tokaranus* form, but 40 exs. (32 %) are the *miyakensis* form.

6. *Basal margin of pronotum narrowly margined in the miyakensis, thickly margined in the tokaranus*

The dominant specimens, even from Nakanoshima Island of the Tokara Islands (6 exs. = 86 %) which is the type locality of *D. tokaranus*, have narrowly margined pronotal base (= the *miyakensis* form), but only 13 exs. (10 %) of the Ogasawara Islands, 2 exs. (12 %) of Ishigaki-jima Island and 6 exs. (40 %) of Iriomote-jima Island have thickly margined pronotal base (= the *tokaranus* form). This character is recognizable in the population of southern areas of Japan.

7. *Eyes not produced in the miyakensis, a little produced laterad in the tokaranus*

All the specimens (7 exs.) of the type locality of *D. tokaranus*, and in most of localities, dominant specimens (79 to 100 %) have a little produced eyes (= the *tokaranus* form), but only three localities, the *miyakensis* form is dominant as follows: Kyushu 6 exs. (75 %), Ogasawara Islands 89 exs. (71 %) and Miyake-jima Island 7 exs. (50 %).

8. *Head obtriangularly depressed behind clypeus in the miyakensis, deeply excavate in the tokaranus*

Most of the examined specimens are well fitted to the character of the *miyakensis* form, but 2 exs. (29 %) of Tokara Nakanoshima Island, 1 ex. (5 %) of Amami-Ôshima Island, and 1 ex. (2 %) of Okinawa Island have shallowly excavated area behind clypeus (these are absolutely anomalous). 2 exs. (14 %) of Miyakejima Island and 1 ex. (less than 1 %) of the Ogasawara Islands are neither excavate nor depressed.

As the result, the diagnostic characteristics recognised between the holotypes of *D. miyakensis* and *D. tokaranus* indicated by NAKANE (1963) and also by me show rich variations among individuals and/or localities including the type localities of both species as mentioned above. Among the specimens studied here, most of them fit well with *D. miyakensis* or have the combined features of *D. miyakensis* and *D. tokaranus*, and only a few anomalous specimens from the Ogasawara Islands, Nakanoshima Island and Amami-Ōshima Island are perfectly coincided with *D. tokaranus*. These results suggests that the diagnostic characters of the two holotypes are thought to be infraspecific variation, and the taxonomic confusion of the species is caused likelihood by the wide characteristic variation and also the anomalous holotype of *D. tokaranus*. With this justification, I propose a taxonomic act to synonymize *D. tokaranus* with *D. miyakensis*.

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要 約

安藤清志：日本産アラメヒラタゴミムシダマシ属の覚書と1異名同種について（鞘翅目ゴミムシダマシ科）。——日本に産するアラメヒラタゴミムシダマシ属は、アラメヒラタゴミムシダマシ *Dioedus miyakensis* (NAKANE, 1963) とフトアラメヒラタゴミムシダマシ *Dioedus tokaranus* (NAKANE, 1963) の2種が知られている。しかし、後者の記載に使用されたタイプ標本は、中根も指摘したように異常型の可能性が高く、従来からこれら2種の区別点は明瞭でなかった。そこで筆者は全国各地の標本をもとに区別点とされる特徴を抽出し、変異幅を含めた2種の分析を試みた。その結果、これらの特徴は、個体間ではなほだしい変異を示すことが判明し、いずれも種内変異と判断し、フトアラメヒラタゴミムシダマシをアラメヒラタゴミムシダマシの新参異名同物とした。

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