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## Elucidating taxonomic problems of the genus *Disparia* Nagano, 1916 of Taiwan and its neighboring areas, with description of one new species (Lepidoptera, Notodontidae)

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### Abstract

The taxonomic problems of the genus *Disparia* Nagano, 1916 in Taiwan and its neighboring areas are elucidated in the present study. The hitherto well-known separated taxonomic units, *Fentonia nigrofasciata* Wileman, 1910 and *Pseudofentonia medioalbida* Nakamura, 1973, are confirmed as the conspecific species based on the type material examination. The latter is here treated as a junior synonym (**syn. nov.**). The taxon previously identified as “*D. nigrofasciata*” in most of studies is actually *D. wilemani* Matsumura, 1925 **stat. rev.** *Fentonia variegata* Wileman, 1910 is retained for the eastern Asian population as a subspecies of widespread *D. diluta* (Wileman, 1910) through comparison with other populations. In addition, one new species, *D. kobayashii* **sp. nov.**, endemic to Taiwan is described. Including *D. maculata* (Moore, 1879), totally five *Disparia* species are distributed in Taiwan.

**Key words:** Notodontidae, Notodontinae, *Disparia*, Oriental region, Taiwan

### Introduction

The genus *Disparia* was established by Nagano (1916) based on *Fentonia sordida* Wileman, 1911. It comprises about ten to eleven species ranging in the Oriental and Palaearctic regions (Schintlmeister, 2008; Kobayashi, 2011). Hitherto the generic relationships, generic boundary, subgroupings and species richness of *Disparia*, as well as of its closely related genera, i.e. *Pseudofentonia* Strand, 1912 *Neodrymonia* Nagano, 1960, *Libido* Bryk, 1949 and *Mesophalera* Matsumura, 1920, have varied across several studies, e.g. Schintlmeister (1992; 1997; 2003 [2004]; 2008), Wu and Fang (2003), Kobayashi *et al.* (2003; 2004), Kobayashi and Kishida (2005), Schintlmeister and Pinratana (2007), Kobayashi (2011) and Kobayashi and Chen (2011). This taxonomic disparity is mainly due to different viewpoints concerning series of shape differences in male genitalia and 8<sup>th</sup> abdominal sternum.

The genus *Disparia* itself has ever been sunk as a subgenus level of *Pseudofentonia* (Schintlmeister, 2003 [2004]; Schintlmeister and Pinratana, 2007; Wu and Fang, 2003). Schintlmeister (2008) separated these two taxa based on the absence of the costal valval process in *Disparia* and also divided *Disparia* into four subgenera, i.e., *Disparia*, *Lanna* Kemal & Kocak, 2005, *Eufentonia* Matsumura, 1922 and *Polystictina* Kiriakoff, 1968, mainly based on male genitalia differences. Though separating *Disparia* and *Neodrymonia*, Schintlmeister also noted the potential subgeneric placement of the latter under the former. On the other hand, Kobayashi (2011) noted that a pair of posterior processes of the male 8<sup>th</sup> sternum can be used to distinguish genus *Disparia* from *Neodrymonia*. The aim of the present study is to summarize taxonomic problems involving systematics of four named *Disparia* species in Taiwan, as well as to describe one new species.

### Material and methods

**Specimen acquisition.** The examined specimens were examined or borrowed from the following institutions and private collections:

**Description.** Wingspan 45–47 mm in male (n= 5); 47–58 mm in female (n= 3).

Head. Male. Antenna bipectinate until  $\frac{1}{2}$  part from base in male, filiform in female.

Thorax. Thoracic segments ashy grey, medial part fuscous. Forewing ground color ashy grey tinged with ochreous; basal fascia grey; antemedial line dark grey, wave-like; postmedial line fuscous, lunulate between R stalk and M3 vein, indistinct in m3 cell, representing as grey and gradually extending distally from CuA1 vein to tornus; submarginal line dark grey, lunulate; marginal scales mosaic with dark grey and ashy grey. Hindwing ochreous, marginal region much darker; marginal scales ashy grey.

Abdomen. Abdominal 1<sup>st</sup> to 6<sup>th</sup> segments dark ochreous, remaining part grey. Male 8th sternum (Fig. 68) sclerotized; two sclerotized process extended posteriorly with apex narrowed, sharp; one medial apodeme extending forwards, gradually narrowed with flat terminal part incised posteriorly.

Male genitalia (Figs 55). Uncus stout, widest at base and tapered gradually toward apex, bifurcate at  $\frac{3}{4}$  part from base to apex. Socii tube-like, long, curved at  $\frac{1}{3}$  part at base, apex truncate; tegumen short; vinculum short, straight; saccus smoothly U-shaped; juxta ladder-like, widest at base. Valva relatively short, widest at medial part, distal part truncate, sclerotized with triangular costal apex process. Phallus moderate long, anterior part wider, one sclerotized process arising 60 degrees of angle to phallus, stout, long, curved at  $\frac{1}{2}$  part from base, apex acute with several strong ridges; vesica tube-like with spinose cornuti arising from basal part to median diverticulum.

Female genitalia (Fig. 75). Ovipositor lobe membranous with short hair-like setae; apophysis anterioris short; apophysis posterioris long; ductus bursae short, sclerotized with basal part stronger; corpus bursae membranous, small with one lip-like signum ventrally.

**Distribution and bionomics.** This species, endemic to Taiwan, is distributed in mid-elevation (1760–2600 m) primary forest of Taiwan. It is presumably univoltine, adults occurring from May to July. The closely related species, *D. dua* and *D. tiga*, are flying from February to September and from March to July, (Schintlmeister, 2008), and are inferred to have more than two generations in one year.

**Etymology.** The new species is dedicated to Dr. Hideki Kobayashi, who is one of the greatest experts of the eastern Asiatic Notodontidae.

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## References

- Chang, B.S. (1989) *Illustrated moths of Taiwan (2)*. Taipei, Taiwan Museum, 310 pp. [in Chinese]
- Fu, C.M. & Tzuoo, H.R. (2004) *Moths of Anmashan Part 2*. Taichung Nature Research Society, Taichung, 215 pp. + 23 pls. [pls. 37–60.]
- Kiriakoff, S.G. (1968) Lepidoptera Familia Notodontidae Pars tertia Genera Indo-Australica. In: Wytzman, P. (Ed.), *Genera Insectorum fasc. 217C*. Kraainem, pp. 1–269 + pls. 1–11.

- Kishida, Y. (1982) The illustrations of Moths from Taiwan (35). *Gekkan Mushi*, 135, 23–24.
- Kishida, Y. (1987) Notes on some moths from Taiwa (VII). *The Japan Heterocerists' Journal*, 142, 261–263.
- Kobayashi, H. (2011) Notodontidae. In: Kishida, Y. (Ed.), *The Standard of Moths in Japan. Vol. 2*. Gakken Education Publishing, Tokyo, pp. 116–138.
- Kobayashi, H. & Chen, L.S. (2011) Notodontidae. In: Wang, M. & Kishida, Y. (Eds.), *Moths of Guangdong Nanling National Nature Reserve*. Goecke & Evers, Keltern, pp. 164–203.
- Kobayashi, H. & Kishida, Y. (2005) Seven new species of Notodontidae (Lepidoptera) from South China. *Tinea*, 18 (4), 320–334.
- Kobayashi, H., Kishida, Y. & Wang, M. (2003) New species and subspecies of the genera *Pseugofentonia* and *Neodrymonia* (Notodontidae) from Nanling Mountains, Guangdong, China. *Tinea*, 17 (5), 232–237.
- Kobayashi, H., Kishida, Y. & Wang, M. (2004) Two new species of *Neodrymonia* (Lepidoptera, Notodontidae) from Guangdong, China. *Tinea*, 18 (3), 161–168.
- Lin, C.S. & Shen, Y.C. (1996) Life history and larval food plants of Notodontidae in southern Taiwan. *Journal Taiwan Museum*, 49, 73–103.
- Matsumura, S. (1925) The Formosan Notodontidae. *Zoological Magazine (Tokyo)*, 37, 391–409.
- Moore, F. (1879) *Descriptions of new Indian lepidopterous insects from the collection of the late Mr. W.S. Atkinson – Part 1*. Calcutta, 198 pp., 5 pls.
- Nagano, K. (1916) Life-History of some Japanese Lepidoptera containing new genera and species. *Bulletin of the Nawa Entomological Laboratory*, 1, 1–96, 1–27.
- Nakamura, M. (1973) Fifth notes on nomenclature of some notodontid-species (Lep.), with description of three new species from Formosa. *Tyo to Ga*, 24 (2&3), 61–77.
- Wileman, A.E. (1910). New Lepidoptera-Heterocera from Formosa. *Entomologist*, 43, 285–291.
- Schintlmeister, A. (1992) Die Zahnspinner Chinas (Lepidoptera, Notodontidae). *Nachr. entomol. Ver. Apollo, Frankfurt/Main*, 11 (Supplement), 1–343.
- Schintlmeister, A. (1997) Moths of Vietnam with special reference to Mt. Fan-si-pan. Family: Notodontidae. *Entomofauna Supplement*, 9, 33–248.
- Schintlmeister, A. (2003 [2004]) The Zoogeography of Taiwan's Notodontidae (Lepidoptera). *Journal of the Zoological Society Wallacea*, 1, 15–26.
- Schintlmeister, A. (2008) *Notodontidae. Palaearctic Macrolepidoptera. Vol. 1*. Apollo Books, Stenstrup, 482 pp., 40 pls.
- Schintlmeister, A. & Pinratana, A. (2007) *Moths of Thailand 5. Notodontidae*. Brothers of St. Gabriel in Thailand, Bangkok, 320 pp., 45 pls.
- Schintlmeister, A. & Lourens, J.H. (2010) The Philippine Notodontidae (Lepidoptera). *Quadrifina*, 8, 1–349.
- Sugi, S. (Ed.) (1987) *Larvae of larger moths in Japan*. Kodansha, Tokyo, 453 pp., 120 pls.
- Sugi, S. (1992a) Notodontidae. In: Heppner, J.B. & Inoue, H. (Eds.), *Lepidoptera of Taiwan*, 1 (part 2, Checklist) pp. 160–164.
- Sugi, S. (1992b) Notodontidae. In: Haruta, T. (Ed.), *Moths of Nepal, Part 1*. *Tinea*, 13 (Supplement 2), 95–122, pls. 27–32.
- Tams, W.H.T. (1927) The elucidation of a muddle in the genus *Fentonia* (Notodontidae). *Entomologist*, 60, 52–53.
- Wang, H.Y. (1995) *Guide book to Taiwan Insects (10). Brahmaeidae, Eupterotidae, Cyclidiidae, Drepanidae, Notodontidae*. Hsu Shin Books, Taipei, 237 pp.
- Wileman, A.E. (1910) Some new Lepidoptera-Heterocera from Formosa. *Entomologist*, 43, 285–291.
- Wileman, A.E. (1911) New and unrecorded species of Lepidoptera Heterocera from Japan. *Transactions of the entomological Society of London*, 1911, 189–406, pls. 30–31.
- Wu, C.S. & Fang, C.L. (2003) *Fauna sinica (Insecta) 15, Lepidoptera: Notodontidae*. Science Press, Beijing, xxvii + 952 pp., 8 pls. [in Chinese, with English summary]
- Wu, S., Fu, C.M., Shih, L.C. & Lin, H.H. (2013) Notodontidae. In: Fu, C.M., Ronkay, L., Lin, H.H. (Eds.), *Moths of Hehuanshan*. Endemic Species Research Institute, Nantou, pp. 254–283, pl. 24: 5–13; 25: 1–20; 26: 1–26; 27: 1–12, figs 41–47.