Moths from Great Tit nests in Japan, with descriptions of immature stages of
*Martyringa ussuriella* Lvovsky (Oecophoridae) and autapomorphies for the genus

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**Abstract** *Niditinea baryspilas* (Meyrick) (Tineidae) and *Martyringa ussuriella* Lvovsky (Oecophoridae) developed from Great Tit nest boxes after breeding in Japan. The former larvae fed on down and fur in the bottom of the nest box, and the latter on bryophytes of nest materials. The immature stages of *M. ussuriella* are described for the first time. Autapomorphies for the genus *Martyringa* are proposed on the basis of larval and pupal characters.

**Key words** *Niditinea baryspilas* (Meyrick), *Martyringa ussuriella* Lvovsky, immature stages, autapomorphy, nidicolous fauna.

**Introduction**

Moth fauna associated with bird nests have been well studied in Europe and North America, and 13 families and over 55 species listed (Hicks, 1959, 1962). In contrast to the situation in the West, the moth fauna of Japanese bird nests has not been well investigated; seven tineids, one oecophorid and three pyralids from the nests of six families and seven species of birds, *e.g.* Tree Sparrow *Passer montanus* (L.) (Passeridae), House Swallow *Hirundo rustica* L. (Hirundinidae), Great Tit *Parus major* L. (Paridae), Goshawk *Accipiter gentilis* (L.) (Accipitridae) and Ural Owl *Strix uralensis* Pallas (Strigidae), have hitherto been recorded (Kiritani, 1959; Tomioka & Nakamura, 2000; Nasu et al., 2007a, b, 2008). In 2007, we reared one tineid and one oecophorid moth from Great Tit nest boxes in Japan.

In the present paper we record these species as nidicolous moths, describe the immature stages of the oecophorid moth, *Martyringa ussuriella* Lvovsky, 1979, and propose autapomorphies for the genus.

**Materials and methods**

The present study is based on specimens reared from the nest materials of Great Tit nest boxes and some larvae of *Martyringa xeraula* (Meyrick, 1910) collected from a chicken yard at Yoshino-cho, Nara Prefecture, in 1981. All specimens are preserved in the private collections of the authors. Nest materials from the bottom of seven Great Tit nest boxes at Sennan-shi, Osaka Prefecture, from which young birds had fledged in 2006, were collected. The nest materials were collected on February 24, 2007. They consisted of numerous dried fragments of bryophytes, much fur and chemical fiber, and down that the birds had gathered as nest materials. The identified bryophytes were 14 species of mosses (*Hypnum, Entodon, Thuidium*, etc.) and four species of liverworts (*Frullania, Heterococcus*, etc.). All identified moth larvae were reared in cases (ht 7 cm, dia. 14 cm), with the nest materials, under laboratory conditions.

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Larvae were slit lengthwise laterally and macerated for about 5 min. in 10% KOH heated in a water bath, and after washing, stained with acetocarmine for examining the larval morphology. Images of adults and immature stages were obtained using a digital camera, Olympus E-500. Illustrations of immature stages were drawn using a drawing apparatus attached to a binocular microscope, Leica MZ12. Digital images of adult and larva were enhanced using Microsoft Photo Editor and Adobe Photoshop software. Scientific names of birds and bryophytes follow the Committee for Check-List of Japanese Birds (2000) and Nakamura et al. (2002).

**Moths from Great Tit nest boxes**

**Family Tineidae**

*Niditinea baryspilas* (Meyrick, 1937)


Material examined. Adult. JAPAN. Osaka Prefecture, Sennan-shi, 1 ♂, emerged 5. iv. 2007 (Y. Nasu leg.), 1 ♀, emerged 11. v. 2007 (Y. Nasu leg.).

Distribution. India, Middle Asia; Japan (Honshu).

Biology. Adults scampered about on disturbance, and burrowed into the nest materials. Larvae fed on fur and down in the nest materials. According to Nasu et al. (2007a), larvae fed on fur and feathers in the nest box detritus of a Ural Owl nest box, and constructed a long, tube-like larval case of fine wood chips. Pupation took place in a spindle-shaped cocoon of fine wood chips. The pupa protruded from the cocoon before emergence. The moth is common indoors and adults have been collected from April to June and in October (Moriuti, 1982). This species has also been reared on dried bonito (Moriuti, 1982), chicken droppings (Tomioka & Nakamura, 2000) and pellets of *Accipiter nisus* (L.) (Accipitridae) (Nasu et al., 2007b).

**Family Oecophoridae**

*Martyringa ussuriella* Lvovsky, 1979 (Figs 1–6)


Descriptions of immature stages

Egg (Fig. 2A). Milky white. Long oval in shape; the major axis about 0.5 mm, and minor axis 0.33 mm; small rectangular patterns of fine raised ridges showing over the surface.

Mature larva (Figs 1C, 2–5). Max length 20 mm. Head brown. Body light brownish white; thorax somewhat darker than the abdomen; on prothorax, prothoracic shield brown, pinacu-
Fig. 1. *Martyringa ussuriella* Lvovsky. A. Adult, ♂. B. Adult, resting posture. C. Mature larva. D. Pupa.

la of L and SV setae groups brown; anal shield brown, scattered with somewhat paler small dots (Fig. 3G); peritreme of spiracles blackish brown; thoracic legs brown, with claws blackish brown (Fig. 2G). Adfrontal areas not reaching epicranial notch (Fig. 2B); six stemmata arranged in a semi-circle, stemma I and II often fused together, stemma III and IV very close to each other (Fig. 4A). A submental pit horseshoe-shaped, opened in posterior margin, situated on the ventral side of the head (Fig. 2D). Mandible with one tooth as illustrated in Fig. 2F. Labrum as in Fig. 2E. Ventral prolegs with biordinal crochets arranged in a complete circle, 56–62 in number (Fig. 3E). Anal prolegs with biordinal crochets arranged in a semi-circle, 54–61 in number (Fig. 3F).

Chaetotaxy (Figs 2–5). Cranial setae as shown in Figs 2B, C; F1 long, located at middle of frontoclypeal region; AF2 longer than AF1; P1 very long, slightly above level of AF2; P2 above the level of P1; Pb located between P1 and P2, and closer to P1 than P2; A3 very long, slightly below the level of Pa; S1 located outside stemmatal area; S2 very long, equidistant from L1 and S3. Thorax (Fig. 3A): on prothorax, L group trisetose, L1 closer to L2 than L3, or equidistant from L2 and L3 (Fig. 5A), MV3s extremely close together, on a
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Fig. 4. Larval stemmatal area of Martyringa spp. A. M. ussuriella Lvovsky. B. M. xeraula (Meyrick).

Fig. 5. Larval prothoracic L setae of Martyringa spp. A. M. ussuriella Lvovsky. B. M. xeraula (Meyrick).

common pinaculum (Fig. 3A), femur of prothoracic leg with a short, thick seta on its antero-inward surface (Fig. 2G); on meso- and metathorax, D1 and D2, SD1 and SD2, and L1 and L2 on a common pinaculum, respectively. Abdomen (Figs 3B, C, D): pinaculum ring of SD group on 1st-8th segments with a small posterior pore, respectively (Fig. 3D); SD1 on 9th segment normal (not hair-like as observed in many gelechioid larvae); L group on 9th segment trisetose, L1 and L2 on a common pinaculum; SV group on 1st and 7th segments bisetose, 2nd-6th segments trisetose and 8th-9th unisetose; anal shield as in Fig. 3G.

Pupa (Figs 1D, 6). Average length 8.5 mm. Yellow brown, with dark brown cremaster. Maxillary palpus not reaching proximo-lateral angle of maxilla. Labial palpus exposed, about 1/3 length of maxilla. Maxilla long, extending beyond tip of prothoracic leg. Antennae long, united together in about posterior 1/3, tips separated, reaching to near middle of 5th abdominal segment (Fig. 6A). Prothoracic femur exposed. Tips of mesothoracic legs concealed by antennae (Fig. 6A). Tips of antennae and metathoracic legs almost reaching middle of 5th abdominal segment (Figs 6A, B). Hindwings concealed by forewings near middle of 3rd abdominal segment (Fig. 6B). Cremaster thick, curved ventrally, with four, long, thick, slightly curved processes on caudal end: four pairs of hooked setae present dorsally, one pair on base, two pairs about in middle and the other pair on near caudal end.

(Fig. 6F) Dorsum of 5th abdominal segment with rows of transverse wrinkles on anterior part (Figs 6B, C).

Distribution. Far East of Russia; Japan (Chishima, Hokkaido, Honshu).

Biology. Eggs were deposited on the surfaces of bryophytes gathered by the bird as nest materials in the bottom of the Great Tit nest box. Larvae fed on dried bryophytes, and constructed an easy tube-like larval case of bryophyte fragments and feces. Pupation took place in a loose cocoon of bryophyte fragments. The moth perhaps hibernates in several larval stages as various instar larvae were observed at the collecting date of the nest materials (February 27). This species has previously been bred from larvae that fed on decaying wood, the bark of Japanese cedar, and dead leaves (Saito, unpublished data; Nasu *et al.*, 2007a).

**Discussion**

Two species of the families Tineidae and Oecophoridae, *Niditinea baryspilas* and *Martyringa ussuriella*, were successfully reared from Great Tit nest boxes for the first time. Until now, only one tineid, *Monopis pavlovskii* (Zagulajev, 1955), has occurred from Great Tit nest boxes in Japan (Nasu *et al.*, 2007b).

The genus *Martyringa* Busck, 1902 (type species: *Oegoconia latipennis* Walsingham, 1882) is a small genus of the family Oecophoridae distributed in India, East Asia and North America, containing three species, *M. latipennis*, *M. xerula* (=ravicapiitis Hodges, 1960) and *M. ussuriella* (Hodges, 1960, 1961; Lvovsky, 1979; Moriiuti, 1982; Saito, 1987). One of these species, *M. xerula* is a famous insect pest of stored grain. *M. ussuriella* is distinguishable from *M. xerula* by several larval characters; in the former, stemmata I and II are
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often fused (Fig. 4A), prothoracic L1 seta is closer to L2 than to L3, or equidistant from L2 and L3 (Fig. 5A), metathoracic D1 and D2 setae are on a common pinaculum (Fig. 3A), L1 and L2 setae are on the 9th abdominal segment on a common pinaculum (Fig. 3C), and almost pinacula are larger than those of the latter; on the other hand, in the latter, sternmata I and II are always separated (Fig. 4B), prothoracic L1 is closer to L3 than to L2 (Fig. 5B), metathoracic D1 and D2 are on separate pinacula, and L1 and L2 are on the 9th abdominal segment often on separate pinacula.

All known immatures of Martyringa (M. ussuriella and M. xeruela) show several notable characteristics as follows. Larvae: 1) S1 seta on head out of stemmatal area (Figs 4A, B) (also in Borkhausenia Hübner, 1825 (Oecophoridae), Saito, unpublished data); 2) submental pit of head horseshoe-shaped, opened in posterior margin (Fig. 2D); 3) femur of prothoracic leg with a short, thick seta on its antero-inward surface (Fig. 2G); 4) pinaculum ring of SD group setae on 1st–8th abdominal segments with a small posterior pore (Figs 3B, C, D) (found also in two subfamilies: Deuterogoniinae (Saito, 2005) and Autostichinae (Saito, unpublished data)). Pupae: 1) antennae united together in posterior 1/3, and tips separated (Fig. 6A); 2) dorsum of 5th abdominal segment with rows of transverse wrinkles on the anterior part (Figs 6B, C); 3) cremaster thick, with four thick processes on caudal end and four pairs of hooked setae dorsally (Fig. 6F). The larval characters 3) and pupal character 3) are found only in Martyringa among the family Oecophoridae, and may be autapomorphies for the genus.

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References


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摘 要

日本においてシジュウカラの巣から発生した蛾およびニセコクマルハキバガ (マルハキバガ科) の幼生期の記載 (那須義次・齊藤寿久)

大阪府泉南市に設置されたシジュウカラの巣箱後の巣箱から、ウスグロイガ Nidiinea barbspilas (Meyrick) (ヒロズコガ科) とニセコクマルハキバガ Martyringa ussuriella Lvovsky (マルハキバガ科) の発生を確認した。ウスグロイガの幼虫は、シジュウカラの巣箱の下に巣材として鳥によって集められた羽毛や飼毛を、ニセコクマルハキバガは同様に集めた繊維類を食していた。

ニセコクマルハキバガとコクマルハキバガの幼虫は、次のような幼生期の形態的特徴をもつ。幼虫: 1) 頭部の S1 剃毛が側眼域の外にある。2) submental pit は後方に開いた馬蹄形である。3) 前胸肢の腸節内側前方の刺毛が太くて、短い。4) 腹部第1−8節の SD2 は微小で、SD1 の斜め前方でこれに接し、SD1 の後方に pore が存在する。蛹: 1) 触角は修理状で左右が接した後、先端で分かれる。2) 腹部第5節の腹面前方に横枝列がある。3) クレンマスターは太く、先端に4本の刺をもち、背面に4対の鈍状刺毛をもつ。幼虫の形質 3) および蛹の形質 3) は、マルハキバガ科内では Martyringa 属のみに見られるため、本属の固有新形質の可能性がある。

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