

Two new species of tortricids attacking conifers in the northwest part of China (Lepidoptera)

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Abstract Two new tortricid pests of conifers are described from China: *Epinotia tianshanensis* Liu & Nasu, sp. nov. and *Zeiraphera gansuensis* Liu & Nasu, sp. nov. Adults, genitalia and immature stages are figured. Some bionomic notes are also given.

Key words Tortricidae, Olethreutinae, *Epinotia tianshanensis* Liu & Nasu, sp. nov., *Zeiraphera gansuensis* Liu & Nasu, sp. nov., new conifer pests in China, immature stages.

Two serious tortricid pests of conifers have recently been found in the northwest part of China. As a result of examination, we have concluded that these two represent two new species. In this paper, they are described with illustrations of adults, genitalia and immature stages, and the biological notes are also given.

Epinotia tianshanensis Liu & Nasu, sp. nov.

Epinotia sp.: Meng, 1992: 29.

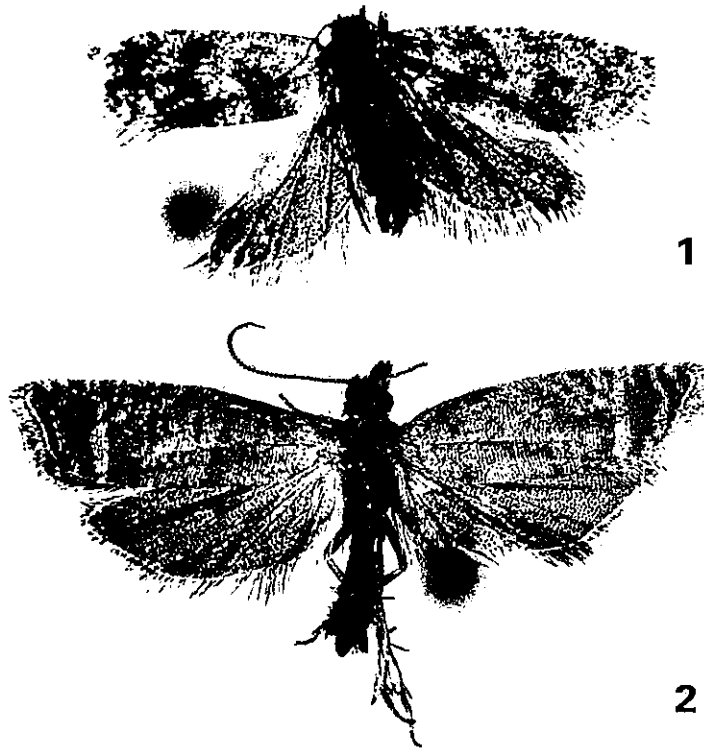
Adult (Fig. 1). Length of forewing 4-5 mm. Head grayish yellow. Antenna grayish yellow, with dark brown annulations. Labial palpus short, grayish yellow. Thorax grayish brown. Forewing without costal fold. Ground color dark brown. Costa with five pairs of whitish strigulae from apex to basal 1/3. Grayish yellow streaks originating from the pairs of costal strigulae; of these streaks the first two confluent below apex, running along termen to tornus, the third wide, sinuous, reaching to tornus. Basal patch indicated by two or three sinuous grayish yellow streaks, occupying basal 1/5. Median fascia consisting of two wide sinuous grayish yellow streaks, originating from the fourth and fifth pairs of costal strigulae, running outwardly to the middle of wing, thence turned inwardly to the middle of dorsum. Cilia grayish brown, with a dark basal line. Hindwing light grayish brown; cilia paler, with a dark basal line.

Male genitalia (Fig. 3). Uncus short, bifurcated terminally. Socius slender, protruded dorsally. Henion conspicuous. Valva rather broad, with small oval cucullus. Aedeagus slender, armed with 11-13 cornuti.

Female genitalia (Figs. 5, 6). Antrum cup-shaped (Fig. 6). Ductus bursae long sclerotized medially. Corpus bursae globular, spinulose on inner surface; two long blade-like signa situated laterally, different in size.

Material examined. Holotype. ♂, Tianshan Mts. (2,050-2,200 m), Xinjiang Uygur Autonomous Region, 25. VII. 1989 (X.Y. Meng leg.). Paratypes. 14 ♂ 11 ♀, same data as holotype. Types are deposited in the Institute of Zoology, Academia Sinica, Beijing, of these three male and three female paratypes in the Entomological Laboratory, the University of Osaka Prefecture, Sakai.

Egg. Oval, punctulate on surface. Color white, dark purple before hatching.



Figs. 1, 2. Adults. 1. *Epinotia tianshanensis* Liu & Nasu, sp. nov., paratype, female. 2. *Zeiraphera gansuensis* Liu & Nasu, sp. nov., paratype, male.

Mature larva. Length 7-8 mm. Head longer than broad, dark brown, with black pigmentation on ocellar area; spinneret slender, with round top. Prothoracic shield and thoracic legs brown. Body grayish white; integument densely granular. Anal plate dark brown. Anal fork absent. Crochets unioordinal; 17-21 on ventral proleg, 14-16 on anal proleg. *Chaetotaxy* (Figs. 9-13): On abdominal segments 1-7, SD1 and SD2 on separated pinacula. On Abdominal segment 9, D2s on same pinaculum; L group bisetose. SV group on abdominal segments 1, 2, 3, 7, 8 and 9 numbering 2, 2, 3, 2, 2, 2, respectively.

Material examined. 4 exs., Tianshan Mts., Xinjiang Uygur Autonomous Region, fixed on 8. VI. 1989 (X.Y. Meng leg.).

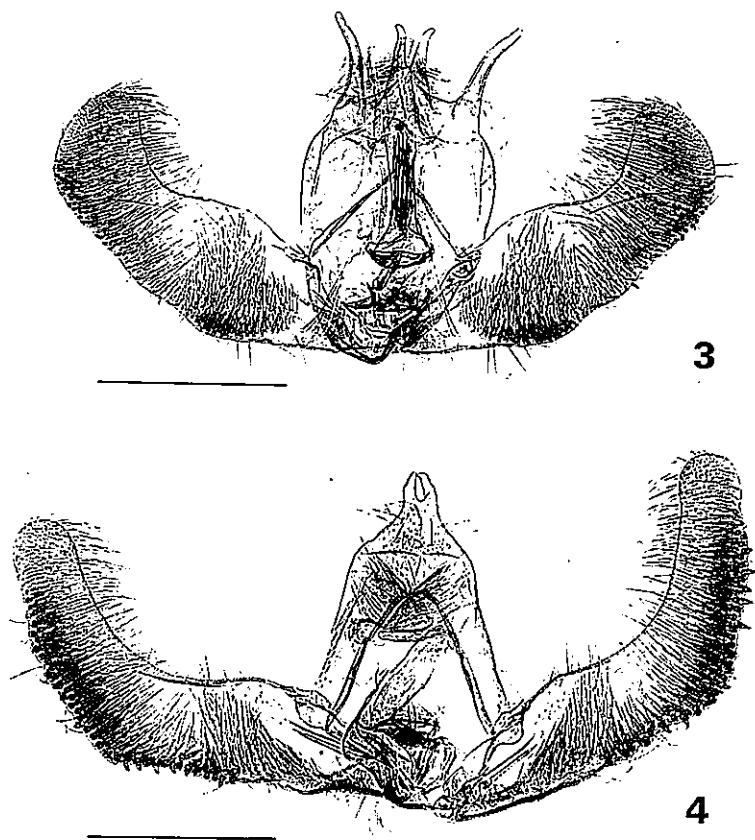
Pupa (Figs. 19, 20). Length 4-5 mm. Color reddish brown. Clypeus with two pairs of setae. Abdominal segment 10 with four pairs of hooked setae.

Material examined. 4 ♂ 3 ♀, Tianshan Mts., Xinjiang Uygur Autonomous Region, fixed on 25. VI. 1989 (X.Y. Meng leg.).

Distribution. China (Xinjiang Uygur Autonomous Region).

Host-plant. *Picea schrenkiana* Fisch. et Mey. (Pinaceae).

Biological note. According to Meng (1992), this moth is univoltine. Eggs are laid singly on the needles in August. Immature larvae overwinter. In next April, larvae injure to the



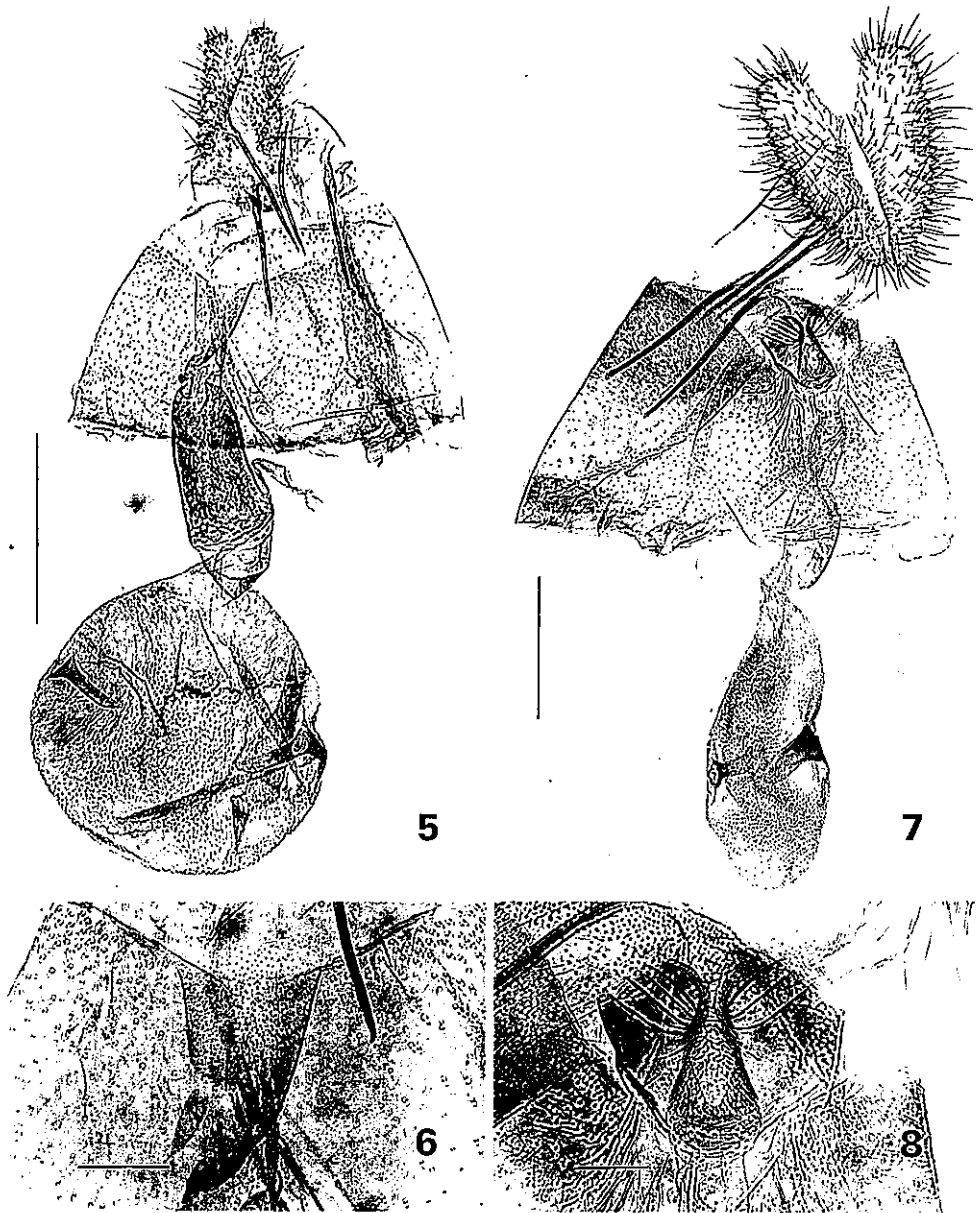
Figs. 3, 4. Male genitalia. 3. *Epinotia tianshanensis* Liu & Nasu, sp. nov., paratype. 4. *Zeiraphera gansuensis* Liu & Nasu, sp. nov., paratype (scales=0.5 mm).

twigs, sticking the needles together with threads and feces. Pupation takes place in the cocoon on twig in early June. Adults emerge in the evening and copulate in the morning in July.

Remarks. This species is similar to *Epinotia rubiginosana* (Herrich-Schäffer, 1851) in general appearance, but differs from it in having shorter forewing, smaller oval cucullus, and cup-shaped antrum.

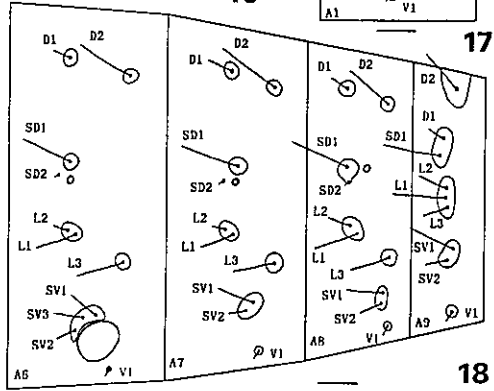
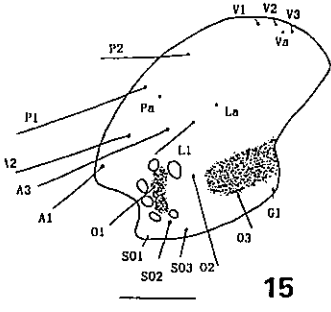
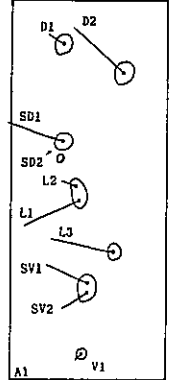
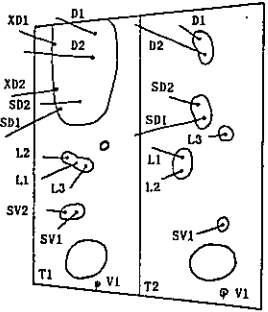
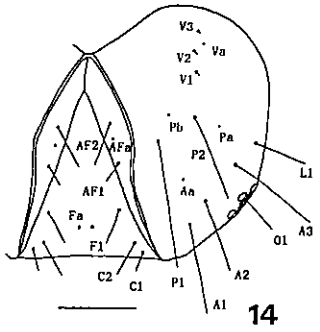
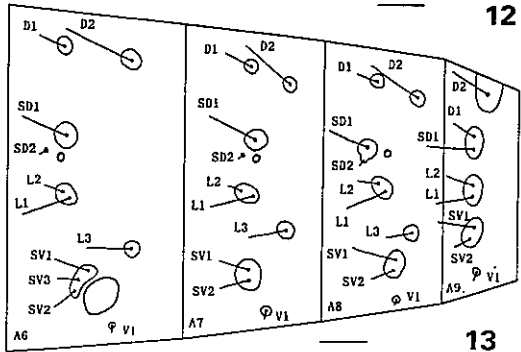
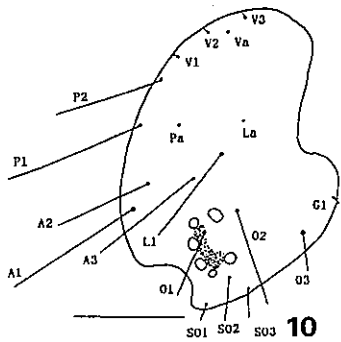
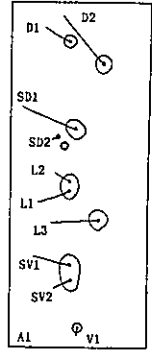
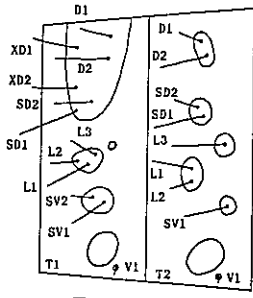
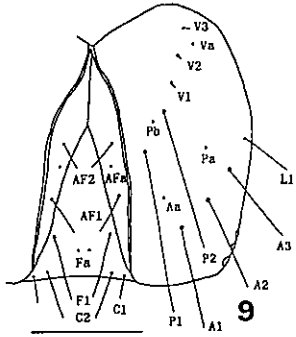
Zeiraphera gansuensis Liu & Nasu, sp. nov.

Adult (Fig. 2). Length of forewing 6-7 mm. Head and labial palpus brownish gray. Antenna brownish gray, with dark brown annulations. Thorax brownish gray. Forewing with costal fold reaching to basal $2/5$ of costa. Ground color yellowish brown. Costa with four pairs of whitish strigulae from apex to the middle. Plumbeous streaks originating from the costal strigulae; of these streaks the first reaching to the top of outer plumbeous streak of ocelloid patch, the others confluent at the top of inner plumbeous streak of ocelloid patch. Basal patch indicated by several sinuous gray streaks, occupying



Figs. 5-8. Female genitalia. 5. *Epinotia tianshanensis* Liu & Nasu, sp. nov., paratype. 6. *Ditto*, detail of antrum. 7. *Zeiraphera gansuensis* Liu & Nasu, sp. nov., paratype. 8. *Ditto*, detail of sterigma (scales of Figs. 5, 7=0.5 mm, scales of Figs. 6, 8=0.1 mm).

basal 1/4. Median fascia consisting of several sinuous gray streaks. Ocelloid patch conspicuous, yellowish brown, laterally bordered with plumbeous streaks (inner streak wide), including some black dashes. Cilia brownish gray, with a dark basal line. Hind-wing light grayish brown; cilia paler, with a dark basal line.



Male genitalia (Fig. 4). Uncus short, bifurcated terminally. Socius triangular. Valva elongate, curved dorsally, with well-developed slender cucullus. Aedeagus short, armed with 10-15 cornuti.

Female genitalia (Figs. 7, 8). Papillae anales large, triangular. Ninth and 8th segments short. Sterigma triangular, with some ridges posteriorly (Fig. 8). Ductus bursae tortuously sclerotized medially. Corpus bursae globular, spinulose on inner surface; two horn-like signa with round apices situated laterally, different in size.

Material examined. Holotype. ♂, Taizishan Forestry Center (2,500 m), Linxia County, Gansu Province, 20. VIII. 1990 (T. H. Cheng leg.). Paratypes. 14 ♂ 32 ♀, same data as holotype. Types are deposited in the Institute of Zoology, Academia Sinica, Beijing, of these three male and three female paratypes in the Entomological Laboratory, the University of Osaka Prefecture, Sakai.

Egg. Oval, granular on surface. Color milky white, blackish brown before hatching.

Mature larva. Length 6-7 mm. Head broad, blackish brown, with black pigmentation on ocellar area and galea; spinneret slender, with round top. Prothoracic shield and thoracic legs blackish brown. Body pale yellow; integument densely spinulose. Anal plate blackish brown. Anal fork absent. Crochets biordinal; 26-31 on ventral proleg, 21-24 on anal proleg.

Chaetotaxy (Figs. 14-18): On abdominal segments 1-7, SD1 and SD2 on separated pinacula. On segment 9, D2s on same pinaculum; L group trisetose. SV group on abdominal segments 1, 2, 3, 7, 8 and 9 numbering 2, 2, 3, 2, 2, 2, respectively.

Material examined. 8 exs., Taizishan Forestry Center, Linxia County, Gansu Province, fixed on 30. VI. 1990 (T. H. Cheng leg.).

Pupa (Figs. 21, 22). Length 6-7 mm. Color reddish brown. Clypeus with two pairs of setae. Abdominal segment 10 with three pairs of hooked setae.

Material examined. 10 ♂ 17 ♀, Taizishan Forestry Center, Linxia County, Gansu Province, fixed on 29. VII. 1990 (T. H. Cheng leg.).

Distribution. China (Gansu Province).

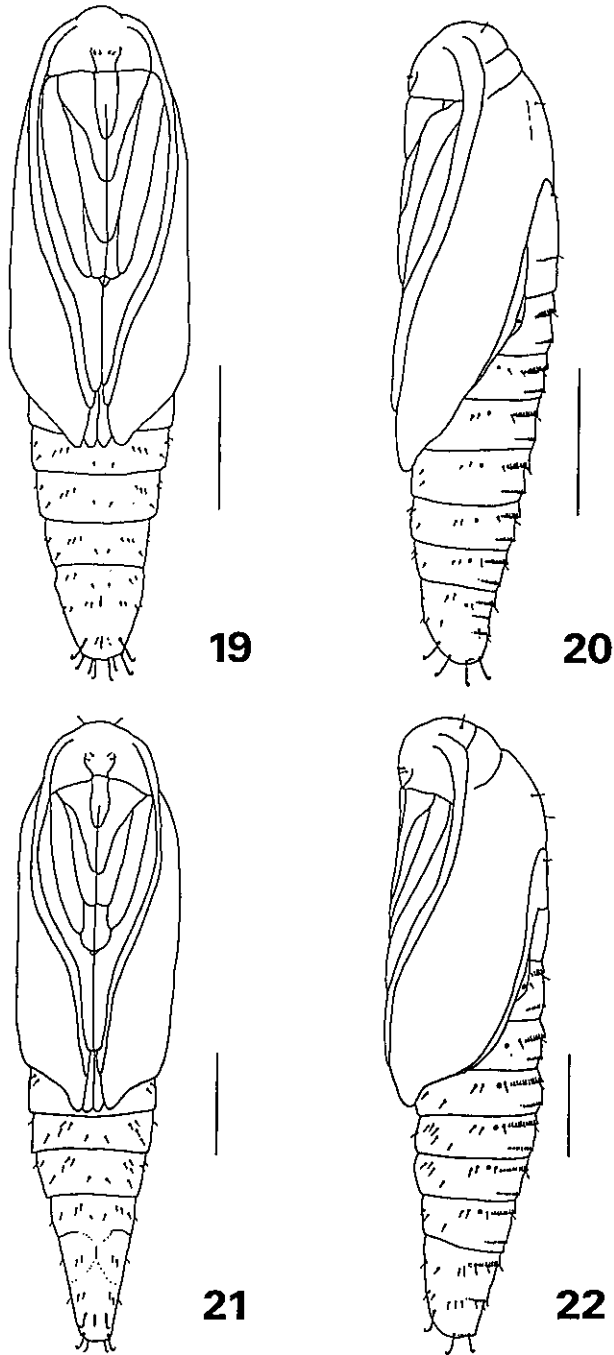
Host-plant. *Pinus tabulaeformis* Carr. (Pinaceae).

Biological note. This moth is univoltine. Eggs are laid singly on the needles in August. Larvae hatch in next May, and feed on the leaf buds, boring into them. Adults emerge in the morning and copulate in the evening in August.

Remarks. This species is superficially similar to *Zeiraphera rufimitrana* (Herrich-Schäffer, 1851), but differs from it in having costal fold, bifurcate uncus, larger papillae anales, shorter 8-9th abdominal segments in female and sterigma with some ridges posteriorly.

Figs. 9-13. Larval chaetotaxy of *Epinotia tianshanensis* Liu & Nasu, sp. nov. 9. Head, frontal view. 10. Head, lateral view. 11. Pro- and mesothoraces. 12. Abdominal segment 1. 13. Abdominal segments 6-9 (scales=0.2 mm).

Figs. 14-18. Larval chaetotaxy of *Zeiraphera gansuensis* Liu & Nasu, sp. nov. 14. Head, frontal view. 15. Head, lateral view. 16. Pro- and mesothoraces. 17. Abdominal segment 1. 18. Abdominal segments 6-9 (scales=0.2 mm).



Figs. 19-22. Pupae. 19. *Epinotia tianshanensis* Liu & Nasu, sp. nov., male, ventral view. 20. *Ditto*, lateral view. 21. *Zeiraphera gansuensis* Liu & Nasu, sp. nov., female, ventral view. 22. *Ditto*, lateral view (scales=1 mm).