

New Record of The Leek Moth, *Acrolepiopsis nagaimo* (Lepidoptera: Acrolepiidae) from Korea

Min-Ki Kim, Taeho Kim¹, Jae-Ha Lim and Soowon Cho^{1*}

Gyeongsangbuk-do Agricultural Research & Extension Services, Daegu 702-708, Korea

¹Department of Plant Medicine, Chungbuk National University, Cheongju 361-763, Korea

한국 미기록종 마좁나방나비목: 파좁나방과의 보고

김민기 · 김태호¹ · 임재하 · 조수원^{1*}

경북농업기술원, ¹충북대학교

ABSTRACT: *Acrolepiopsis nagaimo* (Yasuda, 2000) belonging to the family Acrolepiidae (Lepidoptera) is newly reported from Korea. The species was first collected at Gimcheon-si in 2003 and later they were found to infest Chinese yam, *Dioscorea batatas* at a Chinese yam experimental field of the Institute for Bioresources Research located at Andong in 2008. Diagnostic characteristics of the adult are described and photographs of adult and male and female genitalia are provided.

Key words: New record, Acrolepiid, Korea, *Dioscorea batatas*.

초 록: 나비목 파좁나방과에 속하는 *Acrolepiopsis nagaimo*를 국내 미기록종으로 보고한다. 2003년 처음 김천시에서 채집되었으며, 2008년부터 안동 생물자원연구소의 마 시험포장에서 단마를 가해하는 것이 발견되었다. 성충의 형태적 특징을 기재하고, 성충 및 알개의 사진과 시맥 그림, 그리고 암수 생식기의 사진을 제공한다.

검색어: 미기록종, 파좁나방과, 한국, 단마

The family Acrolepiidae is a small group of moths in Microlepidoptera, belonging to the superfamily Yponomeutoidea (Dugdale et al., 1998). It comprises three genera, *Acrolepia* Curtis, *Acrolepiopsis* Gaedike, and *Digitivalva* Gaedike (Gaedike, 1997), with nearly 120 described species worldwide (Bisby et al., 2012).

In Japan, the leek moth infesting cultivated Chinese yam, *Dioscorea opposita* was in fact noticed long time ago but was simply recorded as a *Plutella* species (Takahashi, 1916). This species was found to feed also on *D. japonica* (Takahashi, 1922). Later, Moriuti (1961) described a new species, *Acrolepia*

dioscoreae, based on specimens reared from two kinds of yam, *D. tokoro* and *D. japonica* and considered *A. dioscoreae* conspecific with the species first noticed by Takahashi. However, three years later *A. dioscoreae* was sunken as a synonym of *A. suzukiella* (Moriuti, 1964), the *Plutella*-like species feeding on *D. opposita* had been left unidentified but considered as *A. suzukiella* until 2000. Yasuda (2000) compared many specimens reared from *D. opposita* with *A. suzukiella* and *A. japonica*, a little known species from *D. japonica*, and found they are different from either species. He described it as a new species, *A. nagaimo*.

This species is known to be a serious pest on cultivated Chinese yam, which is an economically important crop as a local special product in the sand-dune area of Tottori Prefecture (Tanaka, 2001). In Korea, we recently found a species infesting

*Corresponding author: soowon@chungbuk.ac.kr

Received July 5 2012; Revised October 23 2012

Accepted November 9 2012

D. batatas, another Chinese yam species. Upon close examination, we found they are *A. nagaimo*, known to Korea for the first time. So far only one species, allium leafminer (파즙나방), *Acrolepiopsis sapporensis* (Matumura, 1931) has been known to the Korean fauna of Acrolepiidae. In this study, we present a brief morphological characteristics of *A. nagaimo*, with the adult and their male and female genital images.

Taxonomic Accounts

Acrolepiopsis nagaimo Yasuda, 2000 마즙나방(신칭)

Acrolepiopsis nagaimo Yasuda, 2000: 419-425 (type locality: NIAES, Tsukuba, Japan).

Plutella sp.: Takahashi, S., 1916: 108.

Acrolepiopsis suzukiella: JSAEZ, 1980: 127.

Diagnosis. This species is a small sized moth and characterized by a narrow triangular white patch on the dorsum. In comparison to Korean species *A. sapporensis* (파즙나방), the forewing apex of *A. nagaimo* is slightly less pointed, and the forewing has four short white streaks from costa toward tornus on outer half, somewhat obvious or with mottled white scales whereas those of *A. sapporensis* are not apparent. A white spot on dorsum at basal 2/5 is apparent but narrow, while that of *A. sapporensis* is more broad and subtriangular in shape.

Adult (Fig. 1) Wingspan 6.7-10.4 mm (78n). Head gray to light brown, vertex with tuft hairs; palpus dark fuscous, with tip of terminal segment white or light gray; Antenna gray, with

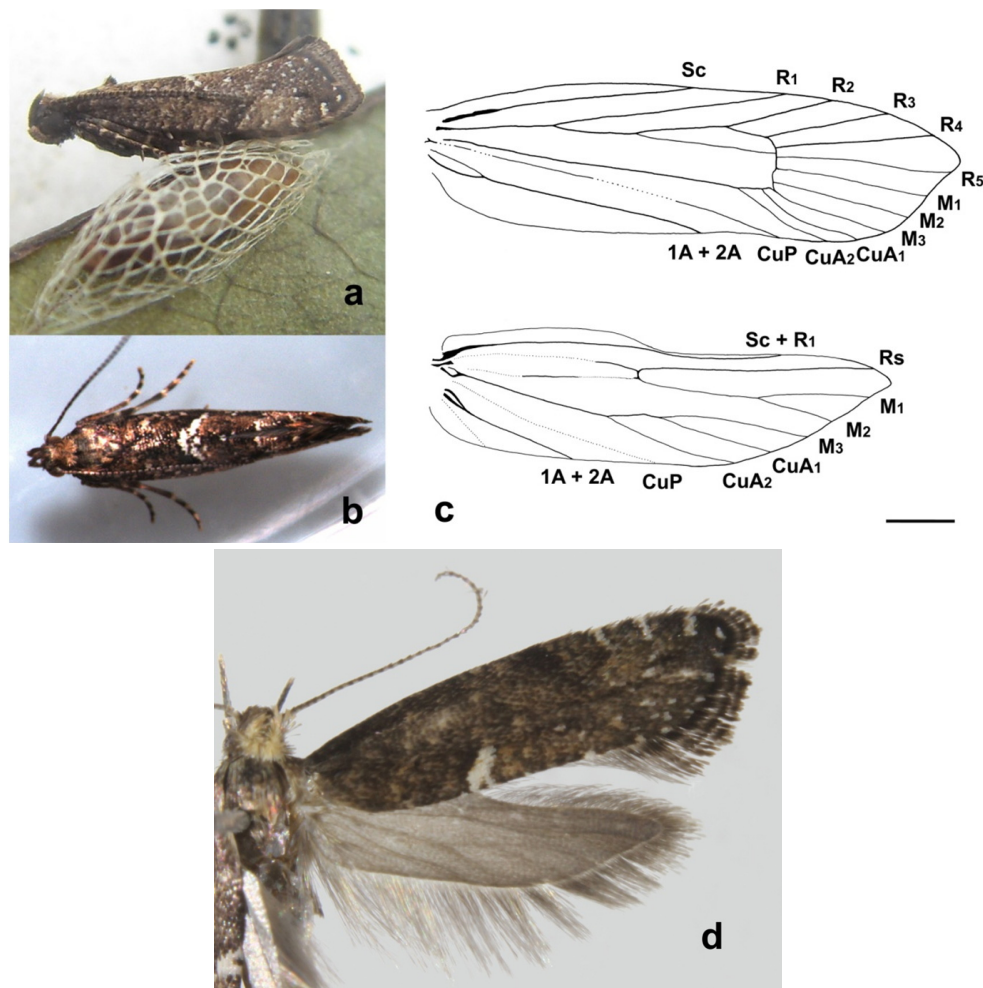
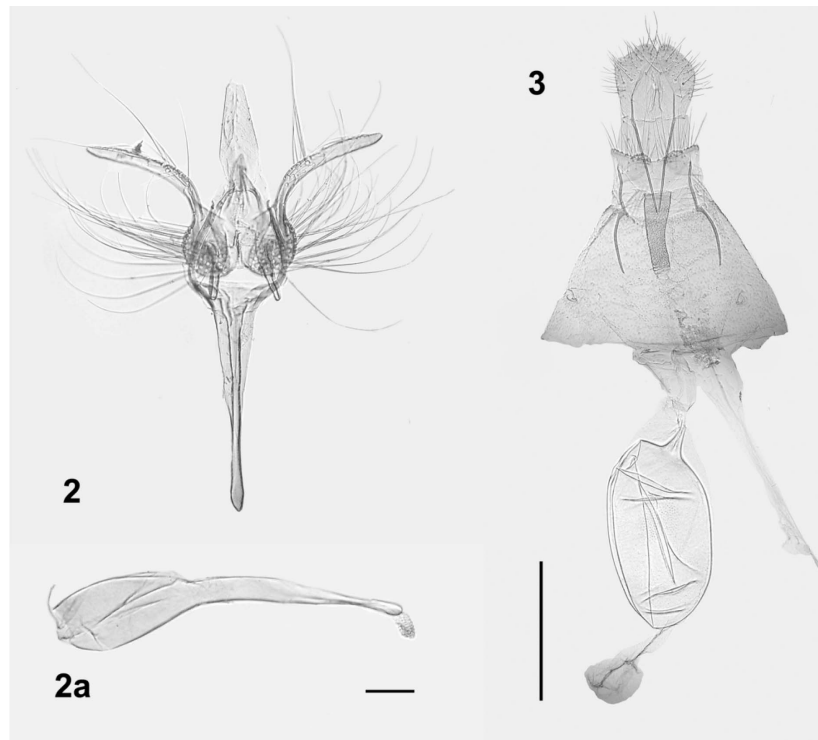


Fig. 1. Adult of *Acrolepiopsis nagaimo* and the wing venation. a) just emerged adult sitting on another mesh-type cocoon, a typical in Acrolepiidae; b) dorsal view of an adult; c) wing venation; d) wing. Scale bar = 0.5 mm.



Figs. 2-3. Genitalia of *Acrolepiopsis nagaimo*. 2. Male genitalia (2a-aedeagus). Scale bar = 0.1 mm; 3. Female genitalia. Scale bar = 0.5 mm.

fuscous ring. Thorax light ochreous, mixed with fuscous scales; Leg grayish and with fuscous; femur lighter than tibia and tarsi, inner side lighter than outer side; tibia and tarsi with white stripes. Abdomen grayish with dark fuscous dorsally, underside light fuscous, posterior end with ochreous cilia. Forewing from costa to apex and termen gently curved, slightly concave beneath apex; ground color dark brown, four short white streaks from costa toward apex on outer half; a white narrow triangular spot on dorsum near basal 2/5; a small white spot near middle of dorsum, three to five small white spots from near middle of termen to tornus; grayish fuscous cilia from apex to tornus. Hindwing: dark gray, with dark gray cilia.

Male genitalia (Fig. 2) Valva slender, strongly curved near basal 1/3, basal 1/4 bulbed with long setae. Gnathos weakly sclerotized. Anellus weakly sclerotized. Saccus slender, very long and straight, slightly bulbed apically. Aedeagus about 1.5 times as long as saccus, basal 1/3 broadened. Vesica without cornuti.

Female genitalia (Fig. 3) Genital plate unsclerotized. Ductus

bursae posterior 1/3-1/2 sclerotized; corpus bursae oval, with an additional sac at anterior end. Posterior apophysis rather straight; anterior apophysis posterior half rather straight, slightly angled outwardly near middle to posterior 2/5, anterior half slightly curved convexly.

Material examined

1 ♂, Deogsan-li, Daedeog-myeon, Gimcheon-si, GB, KOREA, 26.VII.2003 (S.W. Cho leg.), genitalia slide T.H 46; 9 ♂, 7 ♀, Dochon-ri, Bukhu-myeon, Andong-si, GB, KOREA, 20 IX 2009 (M.K. Kim leg); 17 ♂ ditto, genitalia slides T.H 1-6, 8, 13, 15, 18, 19, 22, 24-26, 28, and 29; 14 ♀ ditto, genitalia slides T.H 7, 9-12, 14, 16, 17, 20, 21, 23, 27, 30, and 31

Distribution

Korea (Gimcheon, Andong), Japan (Hokkaido, Honshu)

Host plants. Dioscoreaceae: *Dioscorea opposita* Thunberg, *D. batatas* Decne.

Remarks.

This species in Japan is known to be very similar to *A. japonica* in superficial appearance, but differs from it in having the termen gently curved, in being slightly concave beneath apex of forewing instead of being obviously concave in *A. japonica*, the valva almost straight (not dilated) in apical half instead of being dilated at apical 1/6, and a cross line before the apex of the valva (edge of wall of pocket-like structure) almost invisible by optical microscopic observation instead of being distinct in the male genitalia. However, it is impossible to distinguish them by female genitalia, but the difference of the host plant may serve this purpose (Yasuda, 2000). This species is also superficially similar to *A. sukukiella*, but can be readily distinguished from it by the shorter saccus and aedeagus in the male genitalia and the short sclerotized portion of the ductus bursae in the female genitalia (Yasuda, 2000).

Acknowledgment

This work was supported by the research grant of the Chungbuk National University in 2011.

Literature Cited

- Bisby F., Roskov, Y., Culham, A., Orrell, T., Nicolson, D., Paglinawan, L., Bailly, N., Appeltans, W., Kirk, P., Bourgoin, T., Baillargeon, G., Ouvrard, D., (eds.), 2012. Species 2000 & ITIS Catalogue of life, 2012 Annual checklist. Digital resource at www.catalogueoflife.org/col/. Species 2000: Reading, UK.
- Dugdale, J.S., Kristensen, N.P., Robinson, G.S., Scoble, M.J., 1998. 8. The Yponomeutoidea. in: Kristensen, N.P., (ed.), Lepidoptera, moths and butterflies. Vol. 1: Evolution, systematics, and biogeography. Handbuch der zoologie / Handbook of zoology, Vol. IV, Arthropoda: Insecta, Part 35. Walter de Gruyter, Berlin and New York. pp. 119-130.
- Gaedike, R., 1997. Acrolepiidae. Lepidopterorum catalogus (new series), Fasc. 55. 16 pp. Association for Tropical Lepidoptera and Scientific Publishers, Gainesville, Florida.
- JSAEZ, (ed.), 1980. Major insects and other pests of economic plants in Japan. Japan Plant Protection Association, Tokyo.
- Moriuti, S., 1964. Taxonomic notes on two *Acrolepia*-species of Japan (Lepidoptera: Acrolepiidae). Ins. Matsum. 27, 35~37.
- Tanaka, A., 2001. Sex pheromone of *Acrolepiopsis nagaimo* Yasuda (Lepidoptera: Acrolepiidae), a predominant leafminer on Chinese yam in Tottori Prefecture: field evaluation and activity of the third component. Appl. Entomol. Zool. 36, 203~207.
- Takahashi, S., 1916. Plutellid pests of vegetables. Byochugai Zasshi (J. Plant Protection) 3, 105~109.
- Takahashi, S., 1922. Pests of vegetables. 4th ed., Shokabo, Tokyo.
- Yasuda, K., 2000. A new species of the genus *Acrolepiopsis* Gaedike (Lepidoptera: Acrolepiidae) injurious to Chinese yam and its closely allied species from Japan. Appl. Entomol. Zool. 35, 419~425.