

Report of the genus *Chrysoesthia* (Lepidoptera: Gelechiidae) from the biodiversity hotspot region of Kashmir Himalaya, India – A supplement to Palaearctic elements in the insect fauna of Kashmir Himalaya

Nakeer Razak, Milkhat Singh Saini & Irfan Ahmad

Abstract. *Chrysoesthia sexguttella* (Thunberg, 1794) (Lepidoptera: Gelechiidae) has been encountered in biodiversity hot spot region of Kashmir Himalaya. This is the first report of the genus from the Oriental region in general and the Indian region in particular. Geographical distribution of the moth and nature and extent of the damage inflicted by it are discussed. Economic importance of the host plant in terms of folk medicine has also been highlighted.

Samenvatting. Melding van het genus *Chrysoesthia* (Lepidoptera: Gelechiidae) uit de biodiversiteit hotspot van Kasjmir, India – aan aanvulling van de Palaearctische elementen in de insectenfauna van de Kasjmir Himalaya

Chrysoesthia sexguttella (Thunberg, 1794) (Lepidoptera: Gelechiidae) werd aangetroffen in de biodiversiteit hotspot van de Kasjmir Himalaya. Dit is de eerste melding van dit genus uit het Oriëntaals gebied in het algemeen en uit India in het bijzonder. De geografische verspreiding van deze mot en de wijze en ernst van de schade veroorzaakt aan *Chenopodium* worden besproken. De economische waarde van de voedselplant voor de volksgeneeskunde wordt eveneens belicht.

Résumé. Mention du genre *Chrysoesthia* (Lepidoptera: Gelechiidae) du hotspot de biodiversité au Cashmire, Inde – un supplément aux éléments paléarctiques de la faune de l'Himalaya au Cashmire

Chrysoesthia sexguttella (Thunberg, 1794) fut trouvé au hotspot de biodiversité au Cashmire, dans l'Himalaya, Inde. Il s'agit de la première mention de cette espèce dans la zone orientale en général et de l'Inde en particulier. La distribution géographique et la nature et l'extension des dégâts causés par cette espèce aux *Chenopodium* sont discutées. La valeur économique pour la médecine populaire est aussi mentionnée.

Key words: Biodiversity hotspot, *Chenopodium album*, Palaearctic elements and Zoogeography.

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Introduction

Kashmir Himalaya (330.20' and 340.54' N latitudes and 730.55' and 750.35' E longitudes) lies at the North-Western tip of the Himalayan biodiversity hotspot. The valley supports a rich and spectacular biodiversity of great scientific curiosity and promising economic benefits, chiefly owing to its topographic variations, spanning from the valley through terraced lands and dense forests up to snow-capped alpine peaks (Hussain 2001). The climate of the valley has been

classified as of Mediterranean type. Although native to Northern temperate areas, a number of species of *Chenopodium* are recorded from valley but *Chenopodium album* is the most common of these. It grows everywhere in plains and hills (Stewart 1972). The plant has an immense economic and medicinal value for tribal and other rural populations. Leaves are full of nutrition. Seeds are rich in fat and albumen. Meskawaki Indians are thought to have used an infusion of its roots to treat some urinary ailments. Alaskan Intuits and Navajo considered it as healthy diet and digestive aid. The Cree tribe used it internally and externally to treat rheumatism whereas the Mendocino tribe turned to the leaves for curing stomach ache. The plant is also a source of red dye (Eland 1991). It is boiled and taken like greens and eaten as a pot herb in Scotland. *Chenopodium* has replaced *Artemisia absinthium* as vermifuge (Scudder 1903).

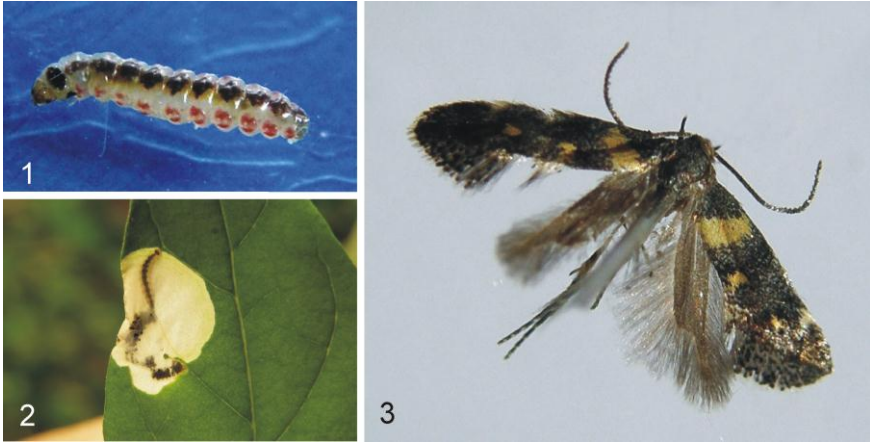
Previous works: Hitherto no insect problem has been reported on the plant in the valley, though there is a report of an insect, *Pterophorus pterodactylus* (Lepidoptera: Pterophoridae), feeding on *Chenopodium* (Fletcher 1920), albeit the report refers to the genus *Chenopodium* in general and does not specify the species. Moreover, two undetermined aphid species have been reported from *C. botrys* and *C. vulgare* (Dar *et al.* 2002). Elsewhere, some other insect species have been reported on the plant: *Chrysoesthia sexguttella* (Triggiani 1978), *Scrobipalpella atriplicella* (Gelechiidae) (De Prins 1988, Jansen 1999), *Cassida nebulosa* L. (Coleoptera: Chrysomelidae) (Anonymous 2007 & Williams 1963), and *Piesma maculatum* (Laporte de Castelneau) (Hemiptera: Piesmatidae) (Stichel 1957).

Materials and methods

Random surveys were carried out in different wild localities ranging in altitude from 1590 to 2700 m, during the years 2006–2009. Larvae infested leaves of *Chenopodium album* were hand picked and collected in small plastic bags. Samples were reared in the lab, using spacious plastic and glass jars covered with dense textured muslin cloth. A part of the adults thus reared were preserved in the form of dry mounts and another part in 70% ethanol, along with larvae and pupae for microscopic examination. Infested plants were photographed in the field, whereas pinned adults were photographed in the lab. Identification of the moth up to the species level was achieved by comparative larval morphology and genital examination of males using Kuroko (1961).

Observations: larvae were found to actively damage the leaves of *Chenopodium album* from June to October causing blotch mines, whitish in colour with dark coloured frass retained in the mines. Mines are formed without any initial gallery and may commence from the leaf centre and from either side of the leaf. Larvae feed in an arched manner from one side to another, between the upper and lower epidermis leaving arched feeding impressions visible to the naked eye, if the blotches are observed against light. On the average a leaf is infested by 1–2 larvae but in certain cases, as high as 8 larvae were found infesting a single leaf. In most of the plants about 10–12% of the leaves were

infested but in some cases infestation reached up to 20%. A single blotch on the average covers about 9% of the leaf surface but in case of small sized leaves the whole leaf lamina is used. Mines of this species have been described by Hering (1957) and Bland et al. (2002). They closely resemble those of *Chrysoesthia verrucosa* (ten Holt 2006). Adult moths were reared from larvae at both extremes of the observation period, suggesting two generations per year and this seems in consonance with earlier works of Hering (1957) and Bland et al. (2002).



Figs. 1–3. *Chrysoesthia sexguttella* (Thunberg, 1794). 1.– Larva exposed from the mine; 2.– Larva in *Chenopodium album* feeding inside its mine showing frass; 3.– Adult moth reared from *Chenopodium album*, Himalaya, Kashmir Valley, India.

Geographical distribution

The species is Holarctic in distribution from Ireland to East Siberia and in North America. It is widespread in Europe including Albania, Austria, Azores, Belarus, Belgium, Bosnia and Herzegovina, Corsica, Czech Republic, Danish mainland, Estonia, Finland, French mainland, Germany, Greek mainland, Hungary, Italian mainland, Latvia, Lithuania, Macedonia, Norwegian mainland, Poland, Portuguese mainland, Romania, Russia, Sardinia, Sicily, Slovakia, Slovenia, Spanish mainland, Sweden, Switzerland, The Netherlands, Ukraine and Yugoslavia (Karsholt & von Nieukerken 2004). In the neighbouring countries of India it has been reported from the Xinxiang province in North-West China (Houhan 2002). Data on the Microlepidoptera fauna of India is scarce and we have not come across any reference about the occurrence of the species in the Oriental region particularly in India. Its report from the Kashmir Himalaya is interesting. It is an addition to the list of 41 species of lepidopterous insects, comprising Palaearctic elements in the insect fauna of Kashmir Valley (Das 1966).

The present record is thus significant from the zoogeographical point of view and provides yet another example of the zoogeographical position of the

Himalaya as a transitional zone between the Palaearctic and Oriental faunal regions.

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