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FIRST RECORD OF *CONICOBRUCHUS ALBOPUBENS* (PIC) INFESTING STORED CLUSTER BEAN SEEDS IN HARYANA, INDIA

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SUMMARY

The present study reports the first record of *Conicobruchus albopubens* (Pic) infesting stored cluster bean (*Cyamopsis tetragonoloba* L. Taub.) seeds from Haryana, India, along with documentation of the nature of infestation. Infested seed samples were collected from seed stores of CCSHAU, Hisar and farmer-saved seed lots from Bhiwani and Mahendergarh districts during 2025. Adult beetles were reared and identified using standard morphological taxonomic keys. The specimens were characterized by black body uniformly covered with white setae, bicoloured antennae, slender hind femur without denticles and subvertical pygidium. Larval feeding caused internal seed damage following oviposition on seed surfaces, leading to gum exudation, seed aggregation and deterioration of storage quality. This finding extends the geographical distribution of *C. albopubens* and highlights its potential as an emerging storage pest of guar. The study emphasizes the need for regular monitoring and appropriate management strategies to minimize post-harvest losses in guar seed storage systems.

Key words: *Conicobruchus albopubens*, cluster bean, taxonomic keys, Infested seed

Cluster bean or Guar, [*Cyamopsis tetragonoloba* L. Taub. (syn. *C. psoraloides*)], is an ancient forage crop native to the tropical region of Northwest India. It is mainly cultivated as a vegetable crop and for seed production to extract guar gum commercially. The genus *Cyamopsis* (Family: Fabaceae, Tribe: Indigofereae) comprises four documented species, three of which are wild: *C. dentata* Torre from South Africa (1960); *C. serrata* Schinz (1888) from Botswana and South Africa; and *C. senegalensis* Guill. & Perr. (1832) from Sahara, Senegal, Saudi Arabia and Africa (Gautam *et al.*, 2024). Cluster bean seeds comprise of the endosperm (35-42%), germ (43-47%) and seed coat (14-17%). The seeds are nutritionally rich, containing 27-37.2% protein, with approximately 50% of the endosperm made up of guar gum (mucilage), which accounts for 42 per cent of the seed mass. Guar gum is a versatile natural biopolymer widely used in the food and industrial sectors. In the food industry, it functions as a gelling, thickening and stabilizing agent in bakeries, dairy products, sauces, dressings and beverages, accounting for approximately 20% of global consumption (NIAM, 2015). Industrial applications include textile printing, paper manufacturing, tobacco processing, pharmaceuticals, cosmetics and dietary supplements. In India, commercial guar gum production commenced in 1956 with the establishment of the first factory, Hindustan Gum ("HIGUM"), at Bhiwani (Haryana) by the Birla brothers in collaboration with Stein Hall and Co. (USA, now Solvay Inc.), facilitating large-scale extraction close to primary production areas. India is the leading global producer of guar, contributing 75-82% of total production, followed by Pakistan, Sudan and USA (NIAM, 2015; Agricultural Statistics at a Glance, 2022). In India, guar is predominantly cultivated in arid agroclimatic regions, including Rajasthan, Gujarat, Haryana, Punjab, Uttar Pradesh, Madhya Pradesh, Tamil Nadu, Maharashtra, Karnataka and Andhra Pradesh. In Haryana, major cultivation occurs in Bhiwani, Rewari and Mahendergarh, producing 120,845 tonnes from 135,806 ha, with the highest recorded productivity of 0.89 t/ha (Crop Production Statistics Information System, 2023).

Cluster bean production is majorly constrained by numerous insect pests and diseases in field conditions and further losses occur during post-

harvest storage due to infestation by bruchid beetles. Historically, insect species associated with cluster bean belonging to genus *Conicobruchus*, which was errected by Decelle (1951) with *Bruchus strangulatus* Fahraeus, 1839 as a type species. The genus *Conicobruchus* is mainly associated with seed infestation of leguminous plants belonging to the tribe Indigoferae (Fabaceae) in Africa (Kingsolver, 1982) and Asia (Arora, 1977). Currently, seven species under this genus are recognized, namely *C. strangulatus*, *C. indicus* (Pic), *C. albopubens* (Pic), *C. decellei*, *C. alpina*, *C. impubens* and *C. kashmiricus*. Therefore, the present study aimed to assess the diversity, distribution and infestation patterns of *C. albopubens* (Pic) associated with cluster bean seeds under storage conditions in Haryana, India.

MATERIALS AND METHODS

Sample Collection and Processing: The infested cluster bean seed samples (100-500g) were collected from the different locations of Haryana (Seed stores, Forage section, Dept. of Genetics and Plant Breeding, Dept. of Seed Science and Technology, CCSHAU, Hisar and farmer's saved seed samples from Mahendergarh (Satnali) and Bhiwani districts) during 2025. Further, the bruchid specimens were sorted and processed for morphological examination and identified based on the taxonomic keys provided by Arora (1979). The high-resolution photography of diagnostic characters were undertaken using Aven Tools 26800B-339 Micro Stereo ZM 10X-93X W/ Light to facilitate accurate identification.

RESULTS

***Conicobruchus albopubens* (Pic):** (Family: Chrysomelidae; Order: Coleoptera) (Fig. 1)
Bruchus albopubens Pic, 1931
Conicobruchus albopubens: Arora, 1977; Kingsolver, 1982
Material examined: 10 male and 5 female, host: infested seeds of *Cyamopsis tetragonoloba* (L.), Hisar (29.1436° N, 75.7032° E), Bhiwani (28.7990° N, 76.1335° E) and Mahendragarh (Satnali) (28.3714° N, 76.0058° E), Haryana, India.

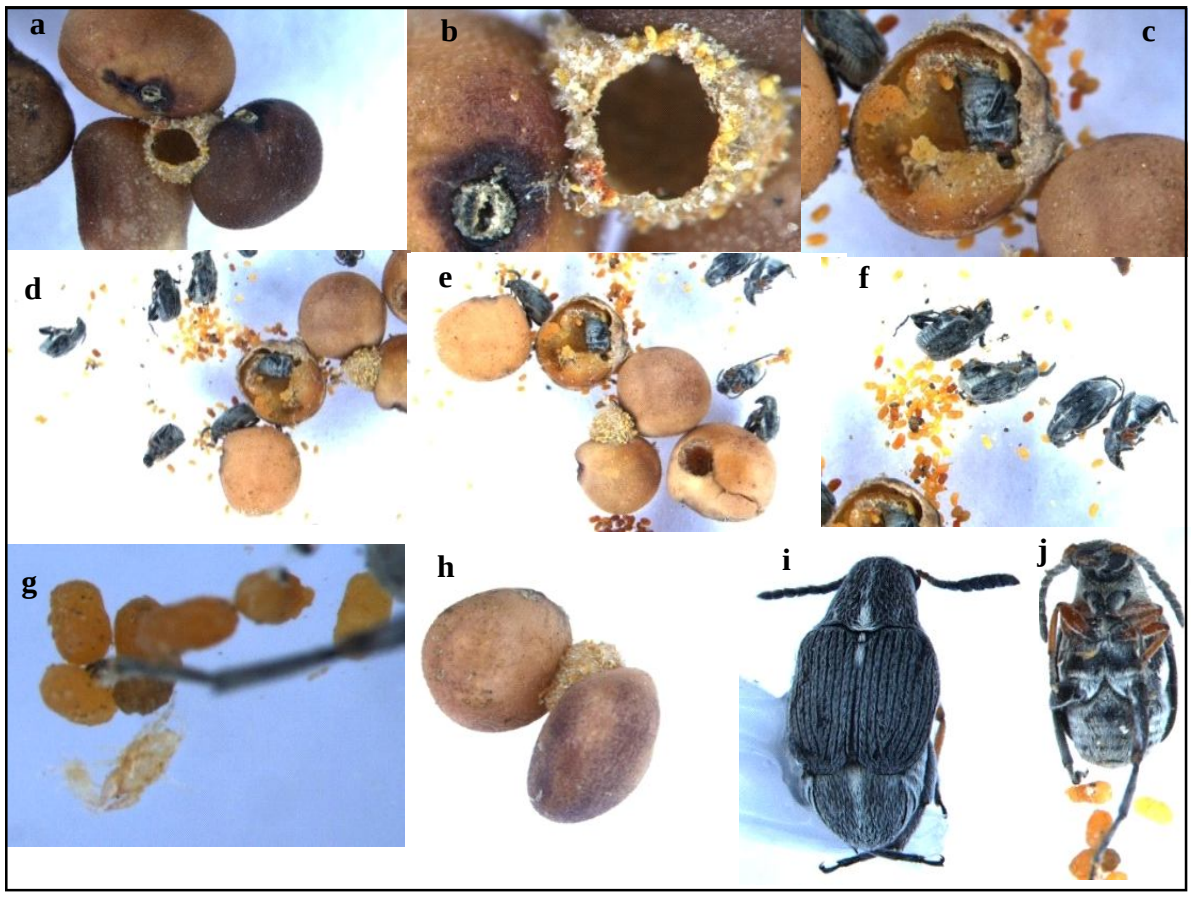

Fig. 1. Infestation of *Conicobruchus albopubens* on cluster bean seeds (a-h); dorsal habitus (i); ventral (j).

Host Plant: *C. tetragonaloba* and *Crotolaria cosmosa* (Arora, 1977)

Measurements: Male = 2.77-3.49 mm; Female = 3.2-3.5 mm

Diagnosis: Body black, moderately sized, uniformly covered with white setae; head black, frons carinate, eyes emarginate with deep narrow canthus; antennae long (exceeding base of pronotum), bicoloured (first four antennal segments yellow, remaining segments black), serrate in male, sub-serrate in female; pronotum black, narrow and oblong, bearing short white setae; scutellum quadrangular, longer than broad with white setae; elytra black, more than twice as long as broad, humeral callus distinct, elytral tubercles absent; fore and mid legs testaceous, bicoloured with black tarsi, hind legs entirely black, hind femur slender, not carinate, without tooth; pygidium black, subvertical, apex curved in male, uniformly beset with white setae (Fig. 1).

Biology: This insect causes damage by ovipositing directly on the seed surface, afterwards the larvae penetrate and feed internally. Infested seeds often exude a sticky gum-like substance, which facilitates aggregation of seeds and subsequently creates favourable conditions for secondary infestation by other storage pests and microbial agents, thereby accelerating seed deterioration and reducing seed viability under storage conditions (Fig. 1).

DISCUSSION

C. albopubens found infesting stored seeds of *C. tetragonaloba*, additionally on *Crotolaria cosmosa* (Arora, 1977) and on the pods of several species of genus *Indigofera*: *I. aspera* DC., *I. parviflora* Wight & Arn., *I. senegalensis* Lam., *I. tinctoria* L. reared in Senegal (Delobel and Le Rü, 2010). The available literature also described *C. albopubens* as *Bruchidius albopubens* based on the African specimen (reared on *I. senegalensis* and on the seeds of *I. basiflora* Gillett in Tanzania) (Delobel and Le Rü, 2010). The illustration by Kingsolver (1982) who redescribed the type species, aligns with our study. Arora (1977) reported the presence of denticles in Indian specimens at the base of the lateral sclerites as compared to African specimens without central sclerites. A rather high variability, therefore, appears to exist in the male genitalia between African and Asian individuals, a variability that may be related to geography and host plant (Delobel and Le Rü, 2010). Likewise, our molecular data analysis demonstrated the paraphyly of genus *Conicobruchus* and existing >26% genetic variability with the genus *Bruchidius* infesting the seeds of *Cyamposis* to form a separate clade (PX508020).

CONCLUSION

This is the first record of *C. albopubens* infesting the seeds of cluster bean (*C. tetragonaloba*) from Haryana, India, with the high-quality photographs of specimens and the infestation.

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