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Crambid Moths of Forest–Agriculture Interface of Pandharkawada Forest Division Maharashtra, India: Diversity and Economic Importance

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ABSTRACT

Crambid moths act as indicators of wetland and grassland ecosystems and include many important crop pests. This family has not been documented in the Pandharkawada Forest Division of Maharashtra. This study aimed to prepare a baseline checklist, describe subfamily composition and larval host use, and assess economic importance. Moths were photographed in the field at six sites during opportunistic day and night surveys from June 2023 to October 2025 and identified with field guides and online databases. Of 39 records, 36 were identified to species and four to genus level. The species belonged to six subfamilies: Spilomelinae (21 species, 58.3%), Acentropinae (five), Pyraustinae (four), Scirpophaginae (three), Crambinae (two) and Odontiinae (one). Eleven species (30.6%) are crop pests, attacking rice, pulses and soybean, vegetables, sugarcane, sesame and jasmine, while 25 species have no known crop damage. Grass and cereal feeders (22.2%) and aquatic-plant feeders (13.9%) were the main host groups. The forest-farm mosaic of the division supports a crambid fauna in which almost one third of the species are crop pests, so regular monitoring and conservation of natural enemies are advisable.

Keywords: *Acentropinae, Crambidae, crop pests, Pandharkawada, Spilomelinae*

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Introduction

The superfamily Pyraloidea, the grass and snout moths, is one of the larger lepidopteran lineages, and its family Crambidae includes more than 10,000 species in 15 subfamilies [1]. They contribute to the ecosystems as herbivores, nocturnal pollinators and food for bats, birds and other insect-eaters. Two subfamilies, Spilomelinae and Pyraustinae, contain over 5,200 species, about one third of the Pyraloidea [2]. Molecular phylogenies place several subfamilies whose larvae live in or near water, among them the Acentropinae, in a wet-habitat group of the Pyraloidea [3]. The family therefore covers a wide ecological range, from dry grassland and forest litter to ponds, streams and flooded land.

Crambid larvae feed on a very wide range of plants, and the family is of obvious economic interest. The yellow stem borer and the leaf folder are regarded as the lepidopteran pests of prime importance in rice, and yield reductions of 1-19% in early-planted and 38-80% in late-transplanted rice have been quoted for the stem borer [4]. The legume pod borer *Maruca vitrata* is a major constraint to grain legume production in the tropics [5]. The sesame leaf webber and capsule borer *Antigastra catalaunalis* is widely considered the most serious pest of sesame in India, with yield losses of 2-75% at flowering and 1.4-31.2% at capsule formation cited in recent work [6] and a significant loss of seed yield in unprotected plots of promising varieties [7].

Other crambids damage vegetables, sugarcane and ornamental plants, whereas many species feed on wild grasses, sedges and aquatic plants and cause no known crop damage. A faunal survey of the family therefore has both ecological and practical value.

The Indian moth fauna was first catalogued by Hampson [8], and modern field guides [9,10] have made field identification much easier. Moth inventories from Maharashtra include those of the northern Western Ghats [11,12], northern Maharashtra [13] and the state fauna volume [14], and an illustrated checklist is available for Delhi [15]. These works deal with many moth families together, and none of them examines the Crambidae of the forests and farmland of the Vidarbha region on its own.

The Pandharkawada Forest Division in Yavatmal district combines dry deciduous forest, scrub, forest nurseries, plantations and cotton-dominated farmland, where soybean and pigeon pea are also grown. Such a mosaic should support both crop-feeding crambids and species of wild grasses and wetter microhabitats, but the balance between the two groups has not been documented. The study therefore asked three questions: which crambid species occur in the division and how are they distributed among subfamilies; which larval host groups dominate; and what share of the species is known to damage crops. Its objectives were to prepare a baseline checklist of the Crambidae of the Pandharkawada Forest Division,

to describe their subfamily composition and larval host use, and to assess their economic importance as crop pests.

Material and Methods

The study was carried out in the Pandharkawada Forest Division, Yavatmal district, in the Vidarbha region of Maharashtra, close to the border with Telangana. Pandharkawada Forest Division lies between 19°52′ N and 20°42′ N latitude and 77°31′ E and 78°34′ E longitude (Figure 1). The climate is tropical, with a hot summer, a monsoon from June to September and a mild winter. The vegetation is a mosaic of tropical dry deciduous forest with teak, scrub and grassland, forest plantations and nurseries, and farmland on which cotton, soybean and pigeon pea are widely grown, together with villages and water bodies.

Six sites representing different habitats were surveyed (Figure 2; Table 1): Krishna Tekadi, a forest ecopark with a semi-man-made ecosystem; Pandhardevi, an old forest near the Hemadpanthi Temple; Gopalpur Nursery, a Forest Department nursery with natural forest and a perennial nala with an agricultural fringe; a roadside shrub forest between Maregaon and Wani; Inzala Forest, a teak-dominant forest; and a plantation area near Botoni village with a grassy belt and bushes. Site coordinates were noted in the field and are listed in Table 1.

Moths were recorded from June 2023 to October 2025. Records were obtained through opportunistic day and night surveys, in which each site was searched on foot for moths resting on vegetation, tree trunks, walls and other surfaces and for individuals attracted to ambient light. No standardised sampling effort, trap or bait was used, and no specimens were collected. Each moth was photographed in the field with a Sony a9 III camera fitted with a 90 mm lens, usually from several angles so that the wing pattern, head, legs and abdomen were visible. All photographs were later examined and compared with published sources.

Identification relied on the field guides of Sondhi [10] and Shubhalaxmi [9], on the descriptions of Hampson [8] and on online moth databases. Classification into subfamilies followed Léger et al. [1] and Mally et al. [2], and subfamily placements are provisional because the higher classification of the Pyraloidea is still being revised. Species identified from photographs, records that could be identified only to genus or higher level were not counted as species. Larval host plants were taken from Robinson et al. [16] and from the agricultural and entomological literature; where a host was reported only for the genus or for a related species, the record was treated as provisional.

Species were tallied by subfamily, by larval host group and by the crop attacked, and percentages were calculated from the number of species. A species was classed as a crop pest when the literature records it as damaging a cultivated plant, irrespective of the damage level in the study area; all other species were classed as having no known crop damage. Field work in the forest areas was carried out with the permission of the Deputy Conservator of Forests, Pandharkawada Forest Division. The photographs and records are available from the author on request.

Results and Discussion

The survey produced 39 crambid records, of which 36 were identified to species level (Table 2). The remaining four records were identified only to genus or higher level and are not counted among the species: *Chalcidoptera* sp., *Ancylolomia* sp., an unidentified crambine.

The 36 species belonged to six subfamilies (Figure 3). Spilomelinae was by far the richest, with 21 species (58.3%), followed by Acentropinae with five (13.9%), Pyraustinae with four (11.1%), Scirpophaginae with three (8.3%), Crambinae with two (5.6%) and Odontiinae with one (2.8%).

The larval host records fell into seven groups (Figure 4). Species feeding on grasses and cereals were the largest group, with eight species (22.2%), followed by aquatic-plant feeders (five species, 13.9%), species on other specific plants (six, 16.7%), species on vegetable, oil and ornamental crops (four, 11.1%), legume feeders (two, 5.6%) and polyphagous species (two, 5.6%). The hosts of nine species (25.0%) are not documented, and these records show how little is known about the larval biology of many Indian crambids.

Eleven of the 36 species (30.6%) are crop pests (Table 3; Figure 5). Four attack rice (*Cnaphalocrocis medinalis*, *Scirpophaga incertulas*, *Parapoynx stagnalis* and *Herpetogramma licarsisalis*), two attack pulses and soybean (*Maruca vitrata* and *Omiodes indicata*), two attack vegetables (*Diaphania indica* and *Spoladea recurvalis*), and one each attacks sugarcane (*Scirpophaga nivella*), sesame (*Antigastra catalaunalis*) and jasmine (*Nausinoe perspectata*). The other 25 species (69.4%) have no known crop damage. All five Acentropinae are aquatic-plant feeders, and the perennial nala at Gopalpur Nursery is the most obvious wet habitat among the six sites.

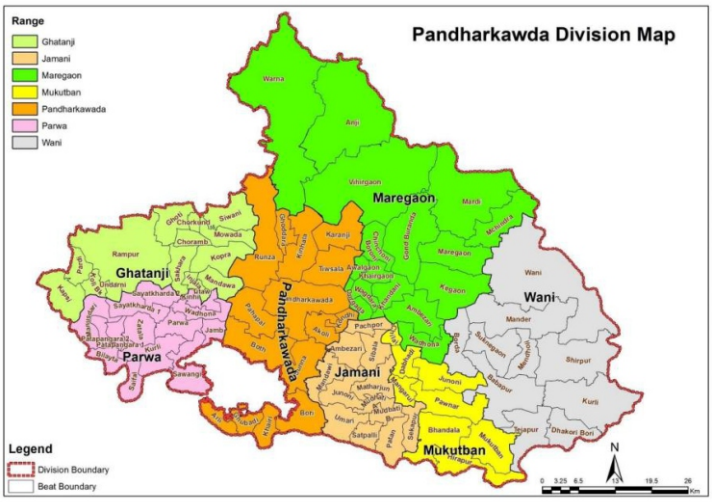


Figure 1. Location map of Pandharkawada Forest Division, Maharashtra, India (source: Office of the Deputy Conservator of Forests, Pandharkawada Forest Division).

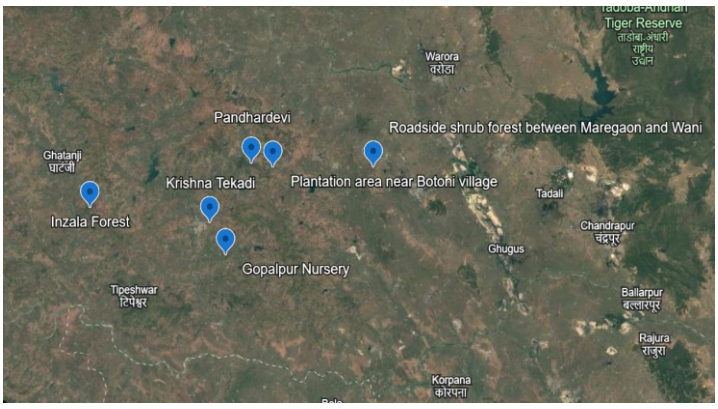


Figure 2. Study sites around Pandharkawada on a satellite map (source: Google Earth).

Table 1: Study sites and their habitats in the Pandharkawada Forest Division

Site	Name	Habitat	Coordinates
1	Krishna Tekadi	Forest ecopark with a semi-man-made ecosystem	20°01′33″ N, 78°34′22″ E
2	Pandhardevi	Old forest near the Hemadpanthi Temple	20°06′52″ N, 78°39′21″ E
3	Gopalpur Nursery	Forest Department nursery with natural forest and a perennial nala with agricultural fringe	19°58′24.18″ N, 78°35′51.2″ E
4	Roadside shrub forest between Maregaon and Wani	Unique shrub habitat	20°05′33″ N, 78°52′38″ E
5	Inzala Forest	Teak-dominant forest	20°03′53.70″ N, 78°21′24.75″ E
6	Plantation area near Botoni village	Grassy belt with bushes	20°06′19″ N, 78°41′40″ E

Table 2: Checklist of Crambidae species recorded from Pandharkawada Forest Division, grouped by subfamily († identification provisional; — no common name)

Sr.	Species	Common name	Larval host / remark
	Spilomelinae (21)		
1	*Antigastra catalaunalis*	Sesame Leaf Roller	Sesame; pest
2	*Blepharomastix achroalis*	—	Not documented
3	*Cnaphalocrocis medinalis*	Rice Leaf Folder	Rice and other grasses; pest
4	*Cnaphalocrocis trapezalis*	—	Grasses (sorghum, maize, sugarcane)
5	*Crypsiptya coclesalis*	—	Bamboo
6	*Diaphania indica*	Cucumber Moth	Cucurbits; pest
7	*Diasemia accalis*	Lawn Ranger	Not documented
8	*Glyphodes bicolor*	Bicolored Pearl Leaf Roller Moth	Moraceae (Ficus, Morus)
9	*Herpetogramma licarsisalis*	Disky Herpetogramma	Grasses, rice; pest
10	*Herpetogramma rudis*	—	Polyphagous
11	*Hodebertia testalis*	—	Apocynaceae
12	*Maruca vitrata*	Legume Pod Borer	Pigeon pea, cowpea, other legumes; pest
13	*Nausinoe perspectata*	Jasmine Moth	Jasminum; pest
14	*Omiodes indicate*	Bean Leaf Folder	Soybean, beans; pest
15	*Pagyda salvalis*	—	Not documented
16	*Parotis marginata*	—	Alstonia scholaris, Gardenia jasminoides
17	*Pygospila tyres*	Chequered Snout	Fabaceae and other plants
18	*Spoladea recurvalis*	Beet Webworm	Amaranthus, beet, Chenopodium; pest
19	*Synclara traducalis*	Variegated Pearl Moth	Not documented
20	*Tyspanodes linealis*	—	Not documented
21	*Ulopeza idealis*	—	Not documented
	Acentropinae (5)		
22	*Elophila scitalis*†	—	Aquatic plants
23	*Eoophyla peribocalis*	Spider Grass Moth	Aquatic plants
24	*Nymphicula blandialis*	—	Aquatic plants
25	*Parapoynx fluctuosalis*	Aquatic Rice Moth	Aquatic plants, rice
26	*Parapoynx stagnalis*	Rice Case Bearer	Rice, aquatic plants; pest
	Pyraustinae (4)		
27	*Anania crocealis*	—	Asteraceae
28	*Ecpyrrhorrhoe damastesalis*	—	Not documented
29	*Pyrausta phoenicealis*	—	Lamiaceae
30	*Pyrausta signatalis*	—	Not documented
	Scirpophaginae (3)		
31	*Scirpophaga gilviberbis*	—	Grasses, sedges
32	*Scirpophaga incertulas*	Rice Yellow Stem Borer	Rice; pest
33	*Scirpophaga nivella*	Sugarcane Top Borer	Sugarcane; pest
	Crambinae (2)		
34	*Arequipa turbatella*	—	Grasses
35	*Chilo plejadellus*	—	Grasses, rice
	Odontiinae (1)		
36	*Autocharis fessalis*	—	Not documented

Table 3: Crambidae crop pests recorded in Pandharkawada Forest Division and the crops attacked

Species	Common name	Crop attacked
Antigastra catalaunalis	Sesame leaf roller	Sesame
Cnaphalocrocis medinalis	Rice leaf folder	Rice
Diaphania indica	Cucumber moth	Cucurbits
Herpetogramma licarsisalis	Disky Herpetogramma	Grasses, rice
Maruca vitrata	Legume pod borer	Pigeon pea, cowpea, other legumes
Nausinoe perspectata	Jasmine moth	Jasmine
Omiodes indicate	Bean leaf folder	Soybean, beans
Parapoynx stagnalis	Rice case bearer	Rice
Scirpophaga incertulas	Rice yellow stem borer	Rice
Scirpophaga nivella	Sugarcane top borer	Sugarcane
Spoladea recurvalis	Beet webworm	Amaranthus, beet, Chenopodium



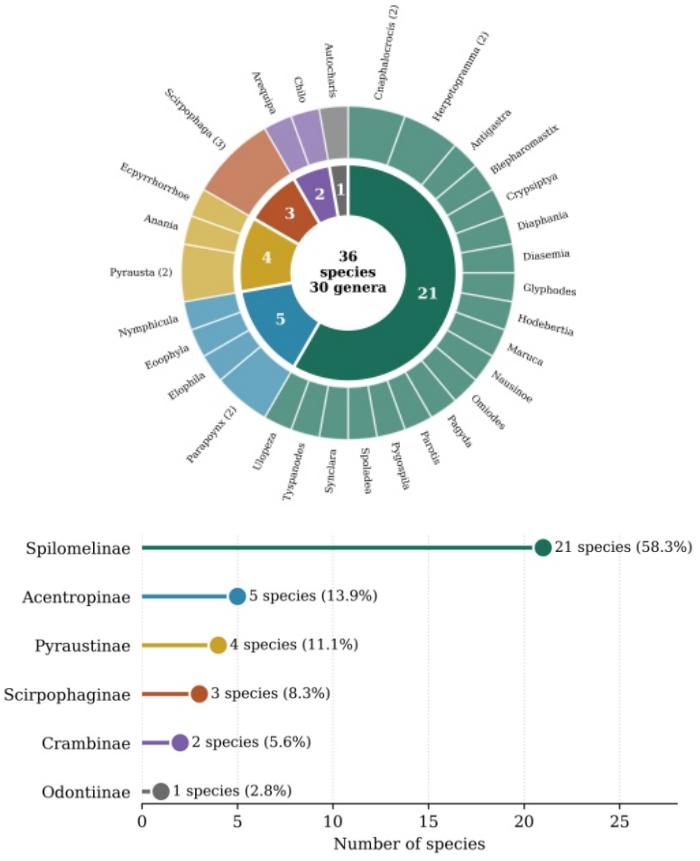


Figure 3. Species richness of Crambidae by subfamily in Pandharkawada Forest Division (n = 36 species).

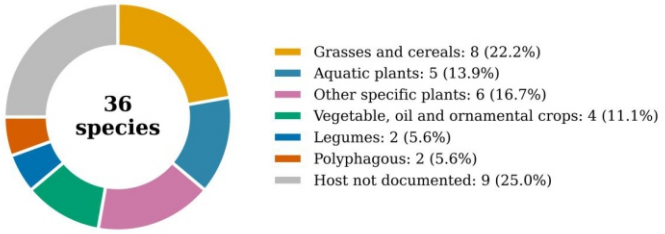


Figure 4. Share of the 36 Crambidae species in each larval host-use group.

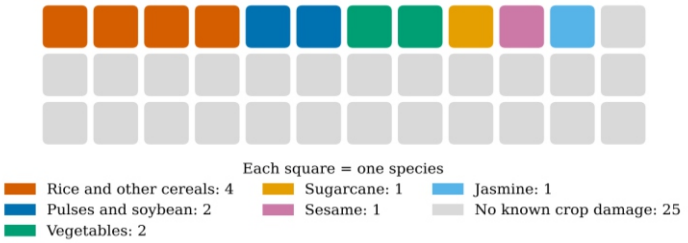


Figure 5. Economic role of the 36 Crambidae species. Each square is one species; coloured squares are crop pests grouped by the crop attacked.

The 36 species show that the forest-farm mosaic of the Pandharkawada Forest Division supports a varied crambid fauna in six subfamilies. The dominance of Spilomelinae, with 58.3% of the species, is expected, because this subfamily is the largest in the Pyraloidea and, with Pyraustinae, holds about one third of its species [2]. The small numbers of Crambinae and Scirpophaginae probably reflect the method rather than the true fauna, since these grass-associated moths are small, cryptic and often active late at night, and they are easily missed during opportunistic searches without light traps. The list should therefore be read as a baseline and not as a complete inventory.

The most striking result is that almost one third of the species (30.6%) are crop pests. This is a high share for a faunal survey and gives the family clear economic weight in a region that grows cotton, soybean, pigeon pea and other crops. The rice yellow stem borer *Scirpophaga incertulas* and the rice leaf folder *Cnaphalocrocis medinalis* are considered the most important lepidopteran pests of rice, and large yield reductions have been quoted for the stem borer, particularly in late-transplanted rice [4]. The legume pod borer *Maruca vitrata* is a major constraint on grain legumes in the tropics [5], which is relevant to a region where pigeon pea and soybean are widely grown. The sesame leaf roller *Antigastra catalaunalis* can cause severe losses in sesame [6,7]. The cucumber moth, the beet webworm, the bean leaf folder, the sugarcane top borer and the jasmine moth are further recognised pests of vegetables, soybean, cane and ornamentals. It must be stressed that the presence of a pest species in the forest division shows its potential as a pest and does not prove economic damage in local fields, and that the records of rice pests are indicative pest of other grassy crops as paddy is not cultivated in the study area.

Several features of the fauna are not related to crop damage. All five Acentropinae feed on aquatic plants, and members of this group belong to a wet-habitat lineage of the Pyraloidea [3]. Their presence suggests that water bodies and wet microhabitats, such as the perennial nala at Gopalpur Nursery, support specialised moths and deserve protection together with the surrounding forest. Species feeding on wild grasses, sedges and herbs, such as members of Crambinae and Scirpophaginae and the grassy belt at Botoni, probably develop on uncultivated vegetation, and they may serve as alternative prey for natural enemies when crops are absent.

At the same time, the high share of species with undocumented hosts (25.0%) and the ten provisional identifications show how little is known about many Indian crambids and how much remains to be learned from rearing and from DNA barcoding.

The results have practical implications. Rice fields are known to shelter natural enemies such as spiders and egg parasitoids, and plant-based sprays have been reported to harm these enemies less than synthetic insecticides [4]. Conserving natural enemies, avoiding broad-spectrum insecticides and monitoring the main pests would therefore be sensible components of crop protection in and around the forest division, and forest patches, plantations and bund vegetation may help to maintain these enemies. The study has several limitations: the records are largely photographic, no abundance data were collected, sampling effort was uneven among sites and seasons, four records are identified only to genus need confirmation from specimens. Seasonal sampling with light traps, rearing of larvae, DNA barcoding and pest incidence surveys in pulse and cane fields would test the patterns reported here.

Conclusion

The Crambidae of the Pandharkawada Forest Division include 36 species in six subfamilies, led by Spilomelinae. Almost one third of the species are crop pests of rice, pulses, soybean, vegetables, sugarcane, sesame and jasmine, and five aquatic species indicate wetland habitats. Monitoring of pests, conservation of natural enemies and protection of wetlands and forest patches are advisable.

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