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Contributions to the Turkish Pyraloidea (Lepidoptera) Fauna from Adıyaman and Malatya Provinces

Türkiye Pyraloidea (Lepidoptera) Faunasına Adıyaman ve Malatya İllerinden Katkılar

Mürşit Ömür KOYUNCU*[1], Murat KÜTÜK[2]
[1] Gaziantep University, Araban Vocational School, Department of Veterinary Medicine, Araban, Gaziantep
[2] Gaziantep University, Faculty of Arts and Sciences, Department of Biology, Gaziantep

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*Sorumlu yazar/*Corresponding author*
Mürşit Ömür KOYUNCU
e-mail: mursitkoyuncu@gantep.edu.tr

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Abstract
This study is based on specimens of the Pyraloidea (Lepidoptera) superfamily collected from Adıyaman and Malatya provinces between 2022 and 2023. A total of 22 species, belonging to 19 genera, were recorded, comprising 14 genera and 15 species from the family Crambidae and 5 genera and 7 species from the family Pyralidae. Adult specimens were collected using light traps, and species identifications were carried out through morphological examination of adult structures and genitalia. Key findings include new locality records for each species, along with details on the altitude and geographic coordinates at which adult individuals were collected. The ecological diversity of the observed Pyraloidea species was evaluated, with particular attention to their roles as pests and bioindicators within agricultural ecosystems. Emphasis was placed on larval feeding behaviors and host-plant interactions, underscoring the group's economic and ecological significance. It provided new distribution records for Pyraloidea species in Adıyaman and Malatya, providing a basis for future research on biodiversity and pest management.

Öz
Bu çalışma, 2022-2023 yılları arasında Adıyaman ve Malatya illerinden toplanan Pyraloidea (Lepidoptera) üst familyasına ait örneklere dayanmaktadır. Crambidae familyasına ait 14 cins ve 15 tür ile Pyralidae familyasına ait 5 cins ve 7 tür olmak üzere, 19 cinse ait toplam 22 tür kaydedilmiştir. Ergin örnekler ışık tuzakları kullanılarak toplanmış, tür teşhisleri ergin yapı ve genital organlarının morfolojik incelemesiyle gerçekleştirilmiştir. Temel bulgular arasında her tür için yeni yerellik kayıtları ile ergin bireylerin toplandığı yükseklik ve coğrafi koordinatlar yer almaktadır. Gözlenen Pyraloidea türlerinin ekolojik çeşitliliği, özellikle tarımsal ekosistemlerdeki zararlı ve biyoindikatör rollerine dikkat çekilerek değerlendirilmiştir. Grubun ekonomik ve ekolojik önemini vurgulamak için larva beslenme davranışlarına ve konukçu-bitki etkileşimlerine önem verilmiştir. Bu çalışma, Adıyaman ve Malatya'da Pyraloidea türleri için yeni yayılış kayıtları sağlayarak, gelecekte biyoçeşitlilik ve zararlı yönetimi konusunda yapılacak araştırmalar için bir temel olmuştur.

INTRODUCTION

In Lepidoptera, butterflies are classified as microlepidoptera and macrolepidoptera. The Pyraloidea superfamily belongs to the microlepidoptera and is one of the most species-rich groups within this category. Worldwide, more than 16.700 species of Pyraloidea have been recorded (URL-1). In a 2023 study, Orak (2023) reported 702 species of Pyraloidea in Türkiye.

Pyraloidea currently includes the families Pyralidae and Crambidae. (Solis 2007). The family Crambidae has more species, comprising over 1.021 genera and more than 10.000 known species. This family is divided into 15 subfamilies: Acentropinae, Crambinae, Erupinae, Glaphyriinae, Heliothelinae, Hoploscopinae, Lathrotelinae, Linostinae, Midilinae, Musotiminae, Odontiinae, Pyraustinae, Schoenobiinae, Scopariinae, and Spilomelinae (Léger et al. 2020).

The family Pyralidae is comparatively less diverse, with 6.236 species described across 1.099 genera (URL-1). This family is classified into five subfamilies: Chrysauginae, Epipaschiinae, Galleriinae, Phycitinae, and Pyralinae (Ahmed et al. 2017). Pyraloidea moths are of considerable ecological importance within the Lepidoptera. Their significance largely arises from their broad dietary range, which enables some species to cause substantial damage to various plant resources. Certain

species are capable of consuming all parts of their host plants, while others feed on a wide variety of plant materials, including woody and herbaceous plants, cones, annual herbaceous species, dried and stored plant products, cultivated crops, fruits, and aquatic vegetation (Atay 2003). In addition, the diet of pyraloid moths may include detritivory, coprophagy, predation, and parasitism, placing them among the most ecologically diverse super families of Lepidoptera (Yen 2004, Mey and Speidel 2008, Solis 2008).

The polyphagous nature and host plant diversity of Pyraloidea larvae have been well documented in faunistic and pest management studies. Members of the genera *Etiella* and *Evergestis* are recognized as serious agricultural pests causing considerable yield losses in legume and crucifer crops, respectively (Lutytska et al. 2021). The box tree moth *Cydalima perspectalis* has been reported as a highly invasive defoliator with major economic impacts on forest and ornamental ecosystems (Canelles et al. 2021). In addition, numerous Pyralidae species such as *Plodia interpunctella* infest stored food products, highlighting their broad ecological amplitude (Rees 2004). Finally, aquatic Crambidae taxa—particularly those within the subfamily Acentropinae—exhibit feeding specialization on submerged macrophytes, influencing freshwater vegetation structure (Pabis et al. 2018).

In Türkiye and neighboring regions such as Syria, Iran, and Iraq, Pyraloidea species are widely distributed across diverse climatic zones. Regions, including Adıyaman and Malatya, are important transition habitats where Mediterranean and continental climate elements overlap. This biogeographical setting supports a rich diversity of Pyraloidea, many of which remain poorly documented. Comparative studies from nearby provinces, such as Diyarbakır (Orak 2023), Mersin (Kılıç 2022), and Nemrut Caldera (Akın and Seven 2020), indicate that the species composition of Pyraloidea varies considerably with elevation, vegetation type, and agricultural practices. Consequently, the present study contributes to understanding the distribution and diversity of Pyraloidea species within these key transitional ecosystems.

The larval feeding behavior of the Pyraloidea superfamily is highly diverse. This variability makes them potential model organisms for studies on biodiversity and ecosystem functioning. Therefore, a deeper understanding of the systematic structure of this group is of great importance for developing effective biological control strategies for the sustainable management of ecosystem services. This study aims to highlight the role and significance of the Pyraloidea superfamily within entomological research.

Given their ecological and economic importance, comprehensive faunistic studies of local Pyraloidea populations can provide essential data for pest management and biodiversity conservation. This study presents new faunistic records from Adıyaman and Malatya provinces and highlights the potential of these areas as model regions for future ecosystem-based entomological research.

MATERIAL AND METHODS

This study is based on adult Pyraloidea specimens captured with Robinson-type light traps during spring and summer from Adıyman and Malatya provinces Figure 1. For each specimen, locality data were recorded and unique field codes were assigned. Some of the adult specimens collected from the study area were dehydrated and therefore required relaxation before wing preparation. Relaxation was performed according to Koyuncu and Kütük 2022. Species identification was carried out using both morphological and genital characteristics. Photographs were taken of all prepared adult specimens and given with their wing span (Fig. 1 -22).

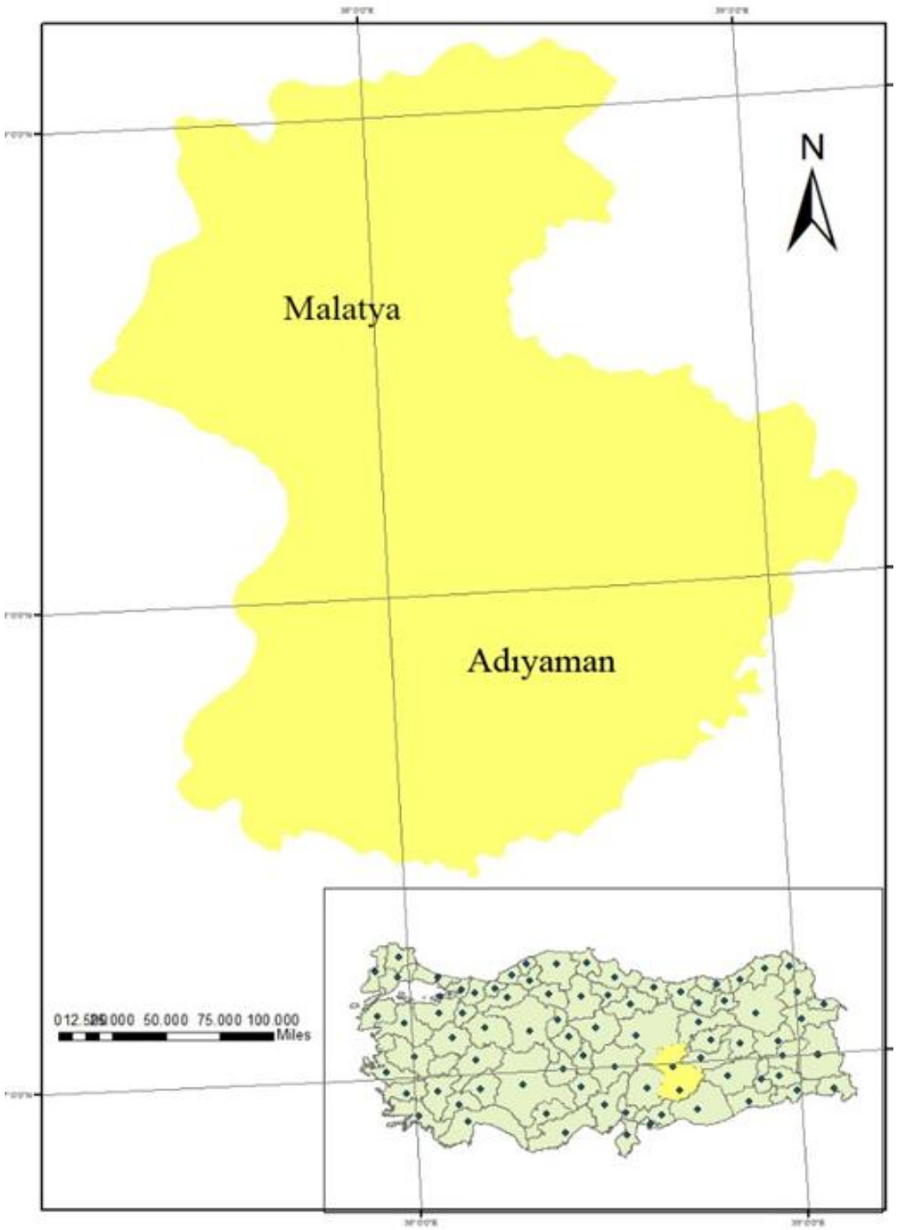


Figure 1: Adıyaman and Malatya provence

RESULTS

In this study, adult specimens were collected from the provinces of Adıyaman and Malatya during the 2022–2023 period. A total of 22 species belonging to 19 genera were identified, comprising 15 species within 14 genera from the family Crambidae, and 7 species within 5 genera from Pyralidae (Table 1). Traps were set in the study areas in May. When the traps were checked, it was observed that the highest number of samples were collected in September and the lowest in November. All identified taxa are presented in alphabetical order. For each adult specimen, wingspan measurements and corresponding wing photographs are provided.

Table 1. Identified Crambidae and Pyralidae taxa

Family	Genus	Species name
Crambidae	*Aporodes*	*Aporodes floralis*
	Chrysocrambus	*Chrysocrambus craterellus*
	Cydalima	*Cydalima perspectalis*
	Cynaeda	*Cynaeda dentalis*
	Dolicharthria	*Dolicharthria punctalis*
		Dolicharthria stigmosalis
	Donacaula	*Donacaula mucronella*
	Ephelis	*Ephelis cruentalis*
	Euchromius	*Euchromius bella*
	Hodebertia	*Hodebertia testalis*
	Metasia	*Metasia rosealis*
	Nomophila	*Nomophila noctuella*
	Palpita	*Palpita vitrealis*
	Pyrausta	*Pyrausta aurata*
	Tegostoma	*Tegostoma albizonalis*
Pyralidae	*Epischnia*	*Epischnia cretaciella*
	Etiella	*Etiella zinckenella*
	Eurhodope	*Eurhodope monogrammos*
	Evergestis	*Evergestis frumentalis*
	Synaphe	*Synaphe antennalis*
		Synaphe consecratalis
		Synaphe moldavica

Family: Crambidae (Latreille, 1810) Figures 2-16

Aporodes floralis (Hübner, 1809) Figure 2

Material examined: Adıyaman, Besni, Karagüveç, 37° 36' N, 37° 45' E, 840 m, 15.08.2022, 2♂♂.

Adıyaman, Besni, Sugözü, 37° 39' N, 37° 48' E, 737 m, 18.07.2023, 1♂.

Chrysocrambus craterellus (Scopoli, 1763) Figure 3

Material examined: Adıyaman, Besni, Sugözü, 37° 39' N, 37° 48' E, 737 m, 18.07.2022, 1♂.

Adıyaman, Besni, Karagüveç, 37° 36' N, 37° 45' E, 840 m, 15.08.2022, 4♂♂.

Adıyaman, Besni, Tetirli, 37° 31' N, 37° 42' E, 824 m, 20.05.2022, 1♂, 1♀.

Adıyaman, Gölbaşı, Harmanlı, 37° 51' N, 37° 45' E, 900 m, 24.09.2023, 2♂♂.

Adıyaman, Besni, Çörmük, 37° 42' N, 37° 55' E, 905 m, 06.09.2023, 4♂♂.

Cydalima perspectalis (Walker, 1859) Figure 4

Material examined: Adıyaman, Besni, Sugözü, 37° 39' N, 37° 48' E, 737 m, 04.08.2022, 2♂♂.

Cynaeda dentalis (Denis & Schiffermüller, 1775) Figure 5

Material examined: Adıyaman, Gölbaşı, Harmanlı, 37° 51' N, 37° 45' E, 900 m, 24.09.2023, 5♂♂.

Dolicharthria punctalis (Denis & Schiffermüller, 1775) Figure 6

Material examined: Adıyaman, Besni, Tetirli, 37° 31' N, 37° 42' E, 824 m, 20.05.2022, 2♂♂, 3♀♀.

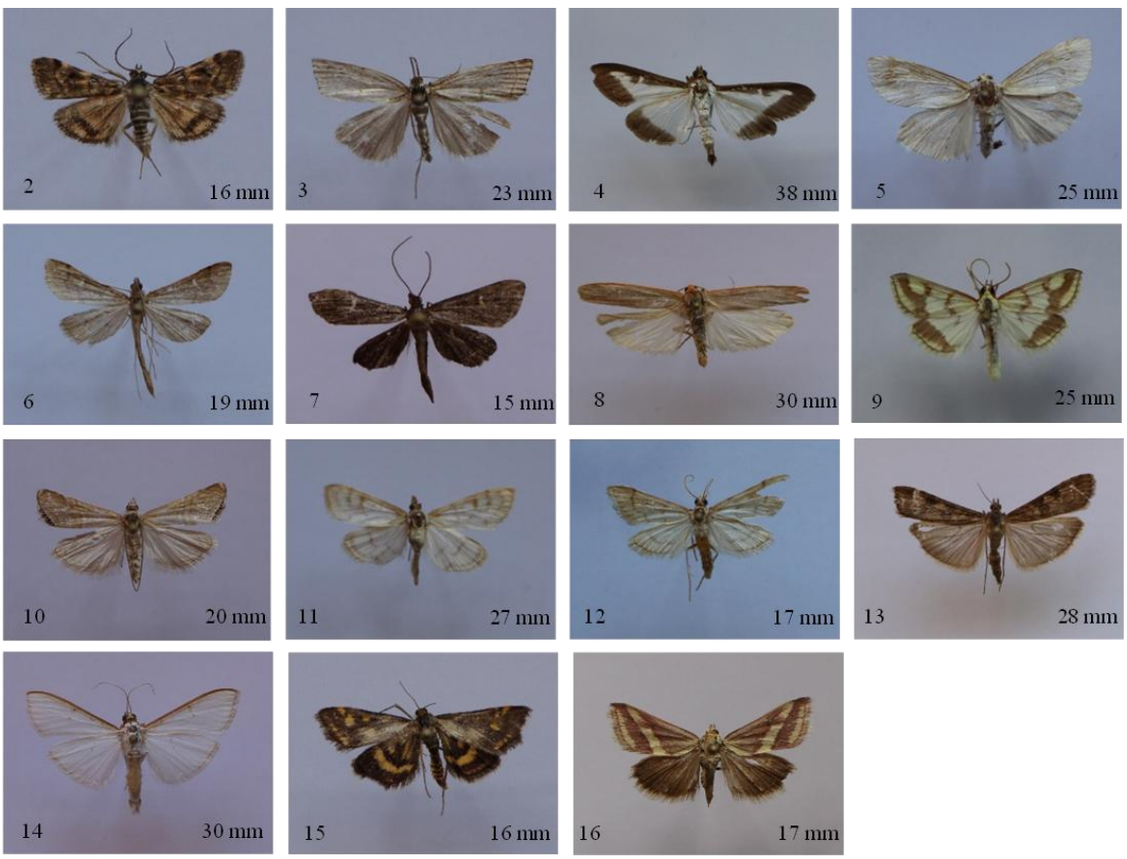
Adıyaman, Besni, Çörmük, 37° 42' N, 37° 55' E, 905 m, 06.09.2022, 2♂♂.

Adıyaman, Besni, Karagüveç, 37° 36' N, 37° 45' E, 840 m, 15.08.2023, 2♂♂.

Adıyaman, Gölbaşı, Harmanlı, 37° 51ˈ N, 37° 45ˈ E, 900 m, 24.09.2023, 1♂, 3♀♀.
Malatya, Darende, Başdirek, 38° 31ˈ N, 37° 24ˈ E, 1436 m, 24.09.2023, 1♂, 1♀.

Dolicharthria stigmosalis (Herrich-Schäffer, 1848) Figure 7
Material examined: Adıyaman, Besni, Sugözü, 37º 39ˈ N, 37º 48ˈ E, 737 m, 18.07.2023, 4♂♂.
Adıyaman, Gölbaşı, Harmanlı, 37° 51ˈ N, 37° 45ˈ E, 900 m, 24.09.2023, 3♂♂.

Donacaula mucronella (Denis & Schiffermüller, 1775) Figure 8
Material examined: Adıyaman, Besni, Sugözü, 37º 39ˈ N, 37º 48ˈ E, 737 m, 18.07.2022, 2♂♂.
Adıyaman, Gölbaşı, Harmanlı, 37° 51ˈ N, 37° 45ˈ E, 900 m, 24.09.2023, 1♂.
Malatya, Darende, Başdirek, 38° 31ˈ N, 37° 24ˈ E, 1436 m, 24.09.2023, 1♀.



Figures 2-16. Adult Crambidae species: 2. *Aporodes floralis*, 3. *Chrysocrambus craterellus*, 4 *Cydalima perspectalis*, 5. *Cynaeda dentalis*, 6. *Dolicharthria punctalis*, 7. *D. stigmosalis*, 8. *Donacaula mucronella*, 9. *Ephelis cruentalis*, 10. *Euchromius bella*, 11. *Hodebertia testalis*, 12. *Metasia rosealis*, 13. *Nomophila noctuella*, 14. *Palpita vitrealis*, 15. *Pyrausta aurata*, 16. *Tegostoma albizonalis*

Ephelis cruentalis (Geyer, 1832) Figure 9
Material examined: Adıyaman, Kahta, Yeni Kale, 37º 52ˈ N, 38º 37ˈ E, 677 m, 30.07.2022, 3♂♂, 1♀.
Adıyaman, Besni, Karagüveç, 37º 36ˈ N, 37º 45ˈ E, 840 m, 15.08.2022, 1♂.
Adıyaman, Besni, Sugözü, 37º 39ˈ N, 37º 48ˈ E, 737 m, 18.07.2023, 4♂♂.
Malatya, Darende, Başdirek, 38° 31ˈ N, 37° 24ˈ E, 1436 m, 24.09.2023, 1♂.

Euchromius bella (Hübner, 1796) Figure 10
Material examined: Malatya, Darende, Başdirek, 38° 31ˈ N, 37° 24ˈ E, 1436 m, 24.09.2022, 2♂♂.

Hodebertia testalis (Fabricius, 1794) Figure 11
Material examined: Adıyaman, Besni, Oyalı, 37º 43ˈ N, 37º 48ˈ E, 1051 m, 18.07.2023, 5♂♂.
Malatya, Darende, Başdirek, 38° 31ˈ N, 37° 24ˈ E, 1436 m, 24.09.2023, 2♂♂.

Metasia rosealis Ragonot, 1895 Figure 12
Material examined: Adıyaman, Besni, Sugözü, 37º 39ˈ N, 37º 48ˈ E,737 m, 20.05.2022, 2♂♂, 1♀.
Adıyaman, Besni, Çörmük, 37° 42ˈ N, 37° 55ˈ E, 905 m, 06.09.2022, 2♂♂.

Nomophila noctuella (Denis & Schiffermüller, 1775) Figure 13
Material examined: Adıyaman, Besni, Çörmük, 37° 42ˈ N, 37° 55ˈ E, 905 m, 06.09.2022, 4♂♂.
Adıyaman, Gölbaşı, Harmanlı, 37° 51ˈ N, 37° 45ˈ E, 900 m, 24.09.2022, 1♂.
Adıyaman, Besni, Karagüveç, 37º 36ˈ N, 37º 45ˈ E, 840 m, 15.08.2023, 1♂.
Malatya, Darende, Başdirek, 38° 31ˈ N, 37° 24ˈ E, 1436 m, 24.09.2023, 1♂.

Palpita vitrealis (Rossi, 1794) Figure 14
Material examined: Malatya, Doğanyol, Gökçek, 37º 17ˈ N, 38º 58ˈ E, 828 m, 07.10.2023, 3♂♂, 1♀.

Pyrausta aurata (Scopoli, 1763) Figure 15
Material examined: Malatya, Doğanyol, Gökçek, 38º 16ˈ N, 39º 00ˈ E, 967 m, 11.10.2023, 5♂♂, 2♀♀.

Tegostoma albizonalis Hampson, 1900 Figure 16
Material examined: Malatya, Darende, Ayvalı, 38º 43ˈ N, 37º 37ˈ E, 1285 m, 31.07.2022, 2♂♂, 1♀.
Malatya, Doğanyol, Gökçek, 38º 16ˈ N, 39º 00ˈ E, 967 m, 28.08.2022, 1♂.

Family: Pyralidae Latreille, 1809 Figures 17-23

Epischnia cretaciella Mann, 1869 Figure 17
Material examined: Adıyaman, Gölbaşı, Harmanlı, 37° 51ˈ N, 37° 45ˈ E, 900 m, 24.09.2022, 1♂.
Adıyaman, Besni, Karagüveç, 37º 36ˈ N, 37º 45ˈ E, 840 m, 15.08.2023, 2♂♂.

Etiella zinckenella (Treitschke, 1832) Figure 18
Material examined: Adıyaman, Gölbaşı, Harmanlı, 37° 51ˈ N, 37° 45ˈ E, 900 m, 24.09.2022, 1♂.
Malatya, Darende, Başdirek, 38° 31ˈ N, 37° 24ˈ E, 1436 m, 24.09.2023, 1♂.

Eurhodope monogrammos (Zeller, 1867) Figure 19
Material examined: Adıyaman, Besni, Çörmük, 37° 42ˈ N, 37° 55ˈ E, 905 m, 06.09.2023, 2♂♂.
Adıyaman, Besni, Karagüveç, 37º 36ˈ N, 37º 45ˈ E, 840 m, 15.08.2023, 5♂♂.

Evergestis frumentalis (Linnaeus, 1761) Figure 20
Material examined: Adıyaman, Besni, Karagüveç, 37º 36' N, 37º 45' E, 840 m, 15.08.2023, 2♂♂.
Malatya, Darende, Başdirek, 38° 31' N, 37° 24' E, 1436 m, 24.09.2023, 2♂♂.

Synaphe antennalis (Fabricius, 1794) Figure 21
Material examined: Adıyaman, Besni, Karagüveç, 37º 36' N, 37º 45' E, 840 m, 15.08.2023, 5♂♂.

Synaphe consecratalis (Lederer, 1855) Figure 22
Material examined: Adıyaman, Gölbaşı, Harmanlı, 37° 51' N, 37° 45' E, 900 m, 24.09.2022, 2♂♂.
Malatya, Darende, Başdirek, 38° 31' N, 37° 24' E, 1436 m, 24.09.2023, 3♂♂.

Synaphe moldavica (Esper, 1794) Figure 23
Material examined: Adıyaman, Besni, Çörmük, 37° 42' N, 37° 55' E, 905 m, 06.09.2022, 2♂♂.
Malatya, Darende, Başdirek, 38° 31' N, 37° 24' E, 1436 m, 24.09.2023, 2♂♂.



Figures 17-23. Adult Pyralidae species: 17. *Epischnia cretaciella*, 18. *Etiella zinckenella*, 19. *Eurhodope monogrammos*, 20. *Evergestis frumentalis*, 21. *Synaphe antennalis*, 22. *S. consecratalis*, 23. *S. moldavica*

DISCUSSION

As a result, a total of 22 species belonging to the Crambidae and Pyralidae families within the Pyraloidea superfamily were identified from Adıyaman and Malatya provinces (Figure 23). Some of these species represent new locality records for the studied provinces, while others are additional records of species previously reported in nearby regions.

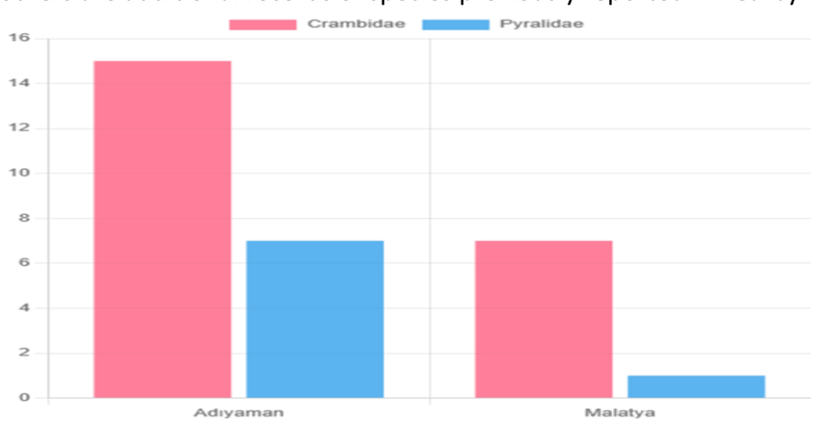


Figure 23. Distribution of Crambidae and Pyralidae species

A total of 15 species within the family Crambidae were identified in this study. Of these, 11 species were recorded from Adıyaman, 5 from Malatya, and 3 species, *Dolicharthria punctalis*, *Donacaula mucronella* and *Hodebertia testalis* were reported for the first time in both provinces. This finding is notable in terms of both novel records and taxonomic diversity (Figure 24). But *Hodebertia testalis* had previously been reported in Türkiye by Koçak and Kemal (2018), but without specific locality details, rendering that record uncertain. Thus, this study provides the first concrete locality data for this species in Türkiye, based on specimens from Adıyaman and Malatya.

The exclusive presence of *Palpita vitrealis* and *Tegostoma albizonalis* in Malatya may be attributed to the province's high altitude zones, conservation of natural habitats, and diverse microhabitats. Within the family Pyralidae, seven species were identified (Figure 24). Three species, *Eurhodope monogrammos*, *Synaphe antennalis* and *Synaphe moldavica* are recorded for the first time from Adıyaman. *Etiella zinckenella* and *Evergestis frumentalis* were recorded in both Adıyaman and Malatya. While previously reported from Malatya, this study marks the first record of both species from Adıyaman. *Synaphe consecratalis*, previously known only from Adıyaman, is documented here for the first time in Malatya. Finally, *Synaphe moldavica* was recorded for the first time in both provinces, representing a new distribution record within Türkiye.

To improve data traceability and facilitate comparative evaluation, the following summary table presents the number of species, genera, and new locality records identified in each province (Table 2).

Table 2. Summary of Pyraloidea diversity in Adıyaman and Malatya provinces

Family	Province	No. of species	No. of genera	New locality records
Crambidae	Adıyaman	11	10	*Dolicharthria punctalis, Donacaula mucronella, Hodebertia testalis*
	Malatya	5	4	*Palpita vitrealis, Tegostoma albizonalis*
Pyralidae	Adıyaman	5	4	*Eurhodope monogrammos, Synaphe antennalis, Synaphe moldavica*
	Malatya	6	5	*Synaphe consecratalis, S. moldavica*
Total	**-**	**22**	**19**	**-**

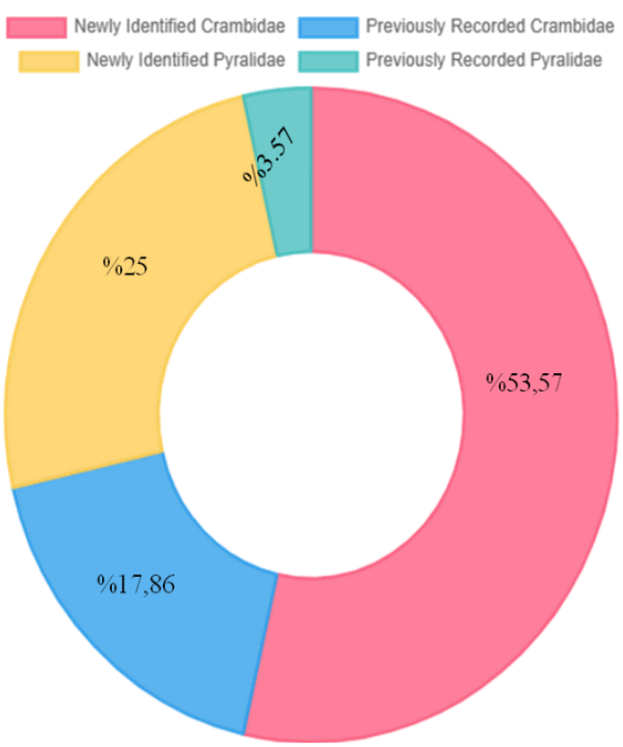


Figure 24. Species density of Crambidae and Pyralidae

Similar ecological findings were reported for Pyraloidea in the Mediterranean region, where polyphagous species such *as Etiella zinckenella* and *Evergestis frumentalis* were identified as major agricultural pests of legumes and crucifers (Lutytska et al. 2021). The aquatic Crambidae species described by Pabis et al. (2018) further demonstrate the ecological versatility of the group across terrestrial and aquatic environments. These results collectively confirm that Pyraloidea can serve as effective bioindicators of environmental conditions and agricultural impact.

The occurrence of *Cydalima perspectalis* in similar climatic regions has previously been associated with defoliation events in mixed forest habitats (Canelles et al. 2021). This supports the interpretation that Pyraloidea distributions may respond sensitively to microclimatic and vegetation gradients.

CONCLUSION

This study, conducted within the scope of faunistic research in the provinces of Adıyaman and Malatya, has revealed the species diversity of the families Crambidae and Pyralidae within the superfamily Pyraloidea, making a significant contribution to Türkiye's overall biodiversity. Some of the species identified represent the first records for the studied provinces and have been newly added to the Türkiye Pyraloidea fauna. In particular, the provision of precise locality data for species such as *Hodebertia testalis*, whose previous distribution was uncertain, is of considerable scientific value. The Crambidae family stands out due to its broad taxonomic structure and ecological adaptability, while the Pyralidae family is notable for its role in agricultural ecosystems. The varied larval feeding strategies and host plant interactions exhibited by these groups underscore their importance in both pest management and ecosystem assessment. In conclusion, it is thought that this study provides data on the Crambidae and Pyralidae fauna of Türkiye and will form a solid scientific basis for future faunistic studies.

The higher number of Crambidae species in lowland agricultural zones of Adıyaman reflects their close association with crops such as maize, legumes, and grasses, whereas Malatya's more mountainous terrain supports species adapted to natural vegetation. Such ecological segregation indicates that Pyraloidea can serve as sensitive indicators of habitat quality and agricultural disturbance, such as altitude, vegetation type, and land use. Species like *Synaphe moldavica* and *Palpita vitrealis* demonstrate habitat specificity, which supports their use as bioindicators in biodiversity assessments. The presence of economically important pest species also emphasizes the need for regular monitoring and ecological risk evaluation (Öztürk et al. 2024).

From a practical perspective, several of the species recorded in this study, particularly *Etiella zinckenella* and *Evergestis frumentalis*, are recognized agricultural pests in Türkiye and neighboring regions (Iren and Ahmed 1973). Their documentation can provide a scientific basis for developing region-specific biological control strategies. Integrating faunistic data into pest management programs can enhance early detection and targeted monitoring efforts, thereby supporting sustainable ecosystem management.

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