

Article

Record of Heterocera moths species from Branis (Biskra, Algeria)

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Abstract: Little is known about moths in arid regions of Algeria. The present study was conducted during September and October 2018, at Branis (Biskra) a region in south east Algeria. Results have permitted to register 5 species of nocturne Lepidoptera under five genera and three families; *Acronicta leporina*, *Agrotis segetum*, *Aspitates gilvaria*, *Dysgonia algira* and *Utetheisa pulchella*. Scientific names of these species, habitat and damage they could cause are given. The families of plants they are recorded on as well as the countries they were recorded in are given according LepIndex (The Global Lepidoptera Names Index).

Keywords: Algeria; Arid; Biskra; Heterocera; Moth

1. Introduction

The moths include a large group of the insect order Lepidoptera, the species of which feed as herbivores in many niches of the ecosystem; from roots to buds of tree tops, on a variety of plants like lichens, mosses, ferns, vascular plants and fallen leaves [1]. Moths vary greatly in appearance, and some species may not at first be recognized as moths. Moths are found everywhere from shore to mountain top, wherever there are plants for caterpillars to eat. All species require particular conditions for their survival and even subtle changes in habitat can result in the loss of a species. Moths are a major part of our biodiversity and play important roles in the ecosystem [2].

Heterocera (Lepidoptera), with more than 120000 species; more often dull-colored and having nightlife, with their wings flat or roof-shaped in the resting position, and rarely have an- tenna ending in a club [3].

In general; few recent studies are done on Lepidoptera [4, 5, 6] and there is little information available on their biodiversity in Algeria [7] especially on Lepidoptera of its arid regions [8, 9] Meanwhile; except that of [10] there is rare works available on moths' biodiversity in Biskra. The present paper deals with data on moth's obtained during a short inventory aimed at providing information on the knowledge of Lepidopteran fauna of the arid regions of Algeria.

2. Materials and Methods

2.1. Study Area

The study was conducted nearby to residential area in Branis (altitude 294 m, latitude 34°59'39.390" Nord, longitude 5°46'15.395" Est); situated at 20 km from Biskra city; it is identified as hot arid eco region; this oases of palm date is characterised mainly by the coexistence of three stages: palmdate as an upper floor, fruit trees as amiddle floor and a lower floor occupied by annual crops especially barely, faba bean, garlic, pumpkin, barley and wheat. Thus the current drought situation has affected the cultivation of annual crops so many parcels are left bare.

2.2. Data Collection

During the present study the moths were collected mostly at night with the help of a light trap. Daily surveys and collection were conducted during September and October 2018. Moths flying around a light source in evening from 19:00 to 22:00 local time were captured manually when resting using plastic bottles. Live specimens are photographed using digital camera. Specimens were etherized then mounted for identification. Species are identified based even on a single specimen collected. Average temperature and relative humidity during sampling ranged from 23°C to 30°C and 32 % respectively (worldweather-online.com).

2.3. Identification

Specimens are identified using available literature [11, 12, 13, 14, 15, 16, 17]. Scientific names of the specimens, host plants and country of record were validated following the database of Natural History Museum website: LepIndex [18].

3. Results

Results have permitted to register 5 species of nocturnal Lepidoptera represented in table 1, as follows:

Table 1. Moths captured in the site of Branis (Biskra, Algeria).

Specie	Descriptor	Familly	Date of capture
<i>Acronicta leporina</i>	(Linnaeus, 1758)	Noctuidae	14/10/2018
<i>Agrotis segetum</i> *	(Denis & Schiffermüller, 1775)	Noctuidae	23/09/2018 and 14/10/2018
<i>Aspitates gilvaria</i>	(Denis & Schiffermüller, 1775)	Geometrida	17/09/2018, 18/09/2018 and 13/10/2018
<i>Dysgonia algira</i>	(Linnaeus, 1767)	Erebidae	13/10/2018
<i>Utetheisa pulchella</i>	(Linnaeus, 1758)	Erebidae	15/09/2018

*persisted alive for more than 11 days in capture without food.

- 1) The Miller "*Acronicta leporina*" (Linnaeus, 1758) (Lepidoptera: Noctuidae) Mainly, univoltin Holarctic species but with a second partial generation. The imago (adults) fly during the months of May, June and July in its first generation and if the conditions are favorable descendants of the earliest, who flew during May, they have time to complete their life cycle flying in the month of August. The entries take place in isolation in the leaves of the nutritious plant. The defoliator caterpillar cited on several leafy plants can be found during the summer months, from June to September, resting or well feeding on the underside face leaving the nerve intact in the early stages while in the last it devours it completely. When it completes its development it forms a chrysalid in a silk cocoon in the bottom of a tunnel that it digs in the rotten wood, abundant in its biotope. It passes the winter in this state, being able to pass in diapauses up to three winters before emerging [19, 20]. According to [18], the species *Acronicta leporina* is reported on Betulaceae (Finland, British Isles and in the Holarctic Region), on Corylaceae (Finland), on Fagaceae (Europe, British Isles), on Salicaceae (Nearctic region, Finland, Canada, British Isles, Holarctic region), on Rosaceae (Finland) and as polyphagous in the Palearctic region.



Figure 1. *Acronicta leporina* (a: original photo, b: Photo from [15]).

- 2) The harvest moth "*Agrotis segetum*" (Denis & Schiffermüller, 1775) (Lepidoptera: Noctuidae) This multi-voltine common agricultural pest-species is reported as the most important terry moth from the economic point of view, whose damage is known in the entire Palearctic region for a very long time. One of the most serious pests in Iran that attacks nearly all vegetables and an important polypahgous pest of sugar beet fields; where many natural enemies are active against it especially carabid beetles [21, 22, 23]. It is a long distance migrant, migrating at least 40 - 60 km [24]. Who, flies twice a year (Jordan) in spring from April to Mai and again in autumn from September to October [25]. Meanwhile, [26] reported that adults occur in May and June, within some regions at least a partial second generation in the autumn. Eggs are laid in small batches on a range of law growing plants and hatch about two weeks later. Larvae feed at night, in their early stages ascending plants to browse on the leaves. Later, however they feed mainly on roots, adopting a typical cutworm habit. The larvae are sluggish and hide during the day-time in the soil near the roots of host plants. Although becoming fully fed in the autumn, most do not pupate until the following spring. According to [27]; these cutworms are important pests of a number of crops in agriculture, horticulture and forestry all over the world. This Palearctic caterpillar has a known devastating effect. It gnaws roots and leaves burying through the day and eating at night then chrysalis on the ground [28]. According to [16]; this species *Agrotis segetum* is reported on Graminae (East Africa, Finland, India, Indonesia, Old world, Palaeartic, West Malaysia), on Leguminosae (East Africa, India, Indonesia, Old World, Palaeartic region, South Africa), on Alliaceae (Indonesia, Old World), on Umbelliferae (Old World), on Asparagaceae (Old World), on Chenopodiaceae (India, Old world, Palaeartic region and West Malaysia), on Chenopodiaceae (Oldworld), On Crucifera (Burma, East Africa, India, Indonesia, Old world, Palearctic region, Southern Africa, Sri Lanka, West Malaysia), on Theaceae (India), on Casuarinaceae (East Africa), on Compositae (East Africa, Old world, Southern Africa, West Malaysia, Yugoslavia), on Rubiaceae (East Africa, India, Indonesia, Java, Kenya, Malawi, Sri Lanka), on Cucurbitaceae (Spain, Old world), on Myrtaceae (East Africa), on Malvaceae (East Africa, Indonesia, Old World, Southern Africa), on Pinaceae (British Isles, East Africa India, Palaeartic region), on Polygonaceae (East Africa, India, Old world, Southern Africa), on Pedaliaceae (Indonesia, Old world), on Rosaceae (East Africa, Old World, Palestine), on Solanaceae (East Africa, India, Indonesia, Old World, Palaeartic region, Sri Lanka, Southern Africa, Zimbabwe), on Vitaceae (Southern Africa), on Verbenaceae (Thailand) and reported as Polyphagous (Austria, British Isles, Old world, West Malaysia).

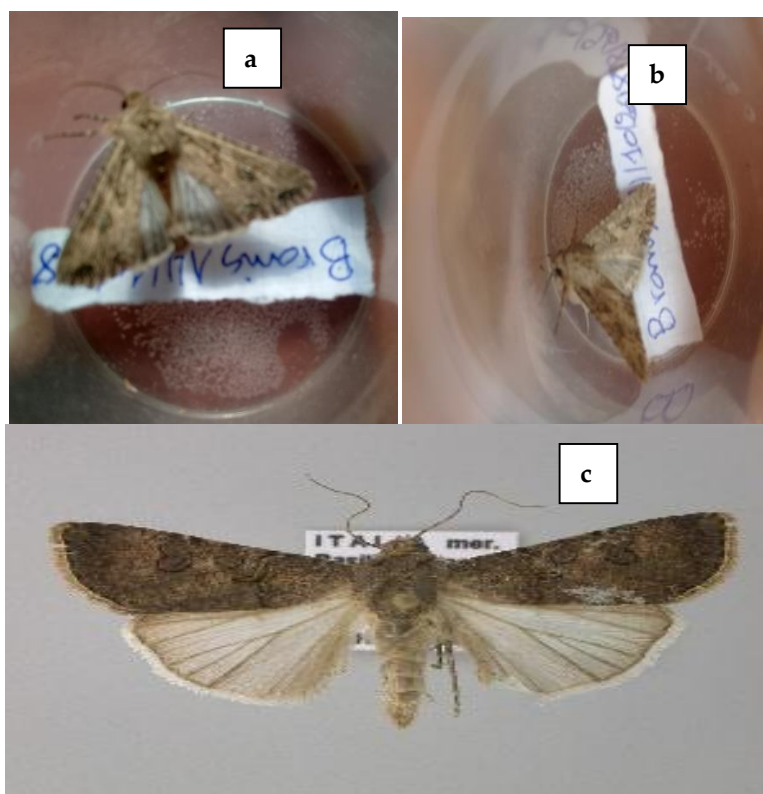


Figure 2. *Agrotis segetum* (a, b: original photos, c: Photo from [16])

- 3) The Straw Bell moth *Aspitates gilvaria* (Denis&Schiffermüller,1775) (Lepidoptera: Geometridae) Mainly thermophilic species considered as vulnerable; as breeding species still appears to be declining. Rare in England, where it inhabits chalk downland. This species is fond of dry heaths and calcareous lawns. It is associated with areas of unimproved, longer turf chalk down land, typically preferring southerly facing slopes with a more open structure with plenty of bare ground. The species is dependent on the larval stage known to feed on a great diversity range of nourishing low growing herbs especially dry grassland herbaceous. Although some of the details of its habitat requirements remain unclear, straw bell populations do appear to be closely dependent on the right sward conditions, which include long tussock grass, a generally herb-rich sward and an open structure with bare ground present. With adults flying from July to August. The larva feed on Wild Thyme (*Thymuspolymictus*), Cinque-foils (*Potentilla* spp.) and Wild Parsnip (*Pastinaca sativa*) from September to June [27, 29, 30]. According to [18]; this species is reported on Ericacea and on Empitraceae (Finland), on Rosaceae (Finland and British Isles), on Umbelliferae and on Labiatae (British Isles) and reported as Polyphagous (British Isles).



Figure 3. *Aspitatesgilvaria* (a: original photo, b: Photo from [15]).

- 4) The Passenger moth "*Dysgonia algira*" (Linnaeus, 1767) (Lepidoptera: Erebidæ), this subtropical, Mediterranean species occurs on several wild plants and is also found occasionally on cultivated pomegranate. Damage caused however; is unimportant. The moths fly in two generations a year: May–June and July–September, though in southern regions also a third generation might occur. Adults appear in the autumn and survive through the winter to deposit eggs in the early spring. Although larvae often feed voraciously, damage to fruit trees is usually insignificant. The caterpillar has been cited with some frequency, in two broods, first generation is in May–July, and a second in August–September. It brows on the leaves of host plants and in their final instar become partly predacious, attacking other larvae and also pests such as aphids. Fully fed larvae enter the soil to form tough cocoons in which they aestivate for 2–3 months before eventually pupating [28, 30, 26]. According to [18]; this species *Dysgonia algira* is reported on Rutaceae (Old World), on Moraceae (Old World), on Leguminosae (East Africa and Southern Africa), on Euphorbiaceae (East Africa, Egypt, Old world, India, Southern Africa, Sri Lanka), on Rosaceae (Algeria, India, Old world, East Africa and Southern Africa), Lythraceae "*Punica granatum*" (Lebanon and Old world), on Salicaceae (East Africa and Southern Africa), on Vitaceae (Old world). The same is reported by [33, 34].

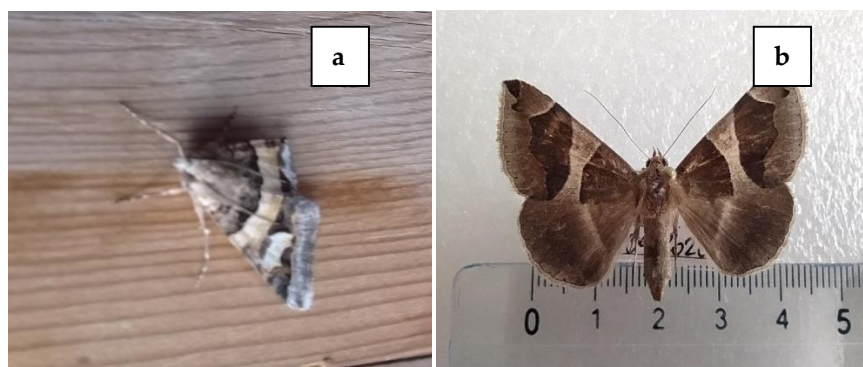


Figure 4. *Dysgonia algira* (a: original photo, b: Photo from [16]).

- 5) The Crimson-Speckled Moth *Utetheisa pulchella* (Linnaeus, 1758) (Lepidoptera: Erebidæ) This species is considered a cosmopolitan and migrant species. It has a wide geographical distribution in tropical regions of the Old World it usually migrates in rather low population density to the north and was occasionally found north of the Alps in Germany, northern France and the British Isles. It is most common in Asia, in the tropics and subtropics of Africa and is even sometimes referred to as harmful to crops. In Europe the species is endangered in the few places of their permanent presence (in coastal areas of the Mediterranean) potentially by the rampant use of the coasts (tourism infrastructure). It is found in Spain from spring to autumn, being more frequent in this last season and at the end of summer. It has several generations per year. In North Africa and in tropical areas, they appear throughout the year. It is generally associated with open ecosystems and drier climates. It inhabits mainly coastal dunes, rocky areas, dry slopes and other warm, gappy vegetated habitats. The caterpillars of *U. pulchella* are polyphagous in the herb layer and defoliators [34, 35, 36, 37, 38]. According to [18]; the species *Utetheisapulchella* is reported on Boraginaceae (East Africa, India, Indonesia, Old world, Southern Africa, Spain, Thailand), Solanaceae (Old world, Indonesia), Leguminosae (East Africa, Old world, India, Indonesia), Musaceae (Southern Africa, East Africa), Gramineae (Brazil, India, Old world), Aliaceae (Indonesia), Malvaceae (Southern Africa) and as polyphagous in Southern Africa.



Figure 5. *Utheisa pulchella* (a: original photo, b: Photo from [17]).

4. Discussion

Among the five identified species only *Dysgonia algira* has been recorded from Algeria in the database of Natural History Museum [18] even though it is already recorded with *Agrotis segetum* by [10]. Meanwhile the species *Utheisa pulchella* is already recorded by [39] in Taza (Jijel, Algeria) and by [8] in Ourgla where reported it as accidental species and it is mentioned by [9] as very abundant species in the regions of Ain Naga and M'ziraa (Biskra, Algeria). Meanwhile [40] reported that the species *Utheisa pulchella*, is probably linked to the presence of its host "*Echium trygorrhizum* (Borraginaceae) in the region of Ouled Djellal. Thus; the species *Aspitates gilvaria* has not been recorded before. Though, in Algeria only the species *Aspitates ochrearia* has already been recorded by [37] in Taza (Jijel, Algeria). Meanwhile, *Acronicta leporina* adults are collected during September and October may be they are descendants of first generation who complete their cycle flying as conditions are favorable. From our findings it is obvious that significant areas of arid regions still remain insufficiently explored. Moreover, biology and ecology of this possible highly economic important group are also less studied. Therefore, efforts should be given on more collections in unexplored areas.

Conclusions

The results of this survey compile a preliminary moth diversity in Branis (Biskra, Algeria), it is characterized by the presence of three principal families (Erebidae, Geometridae and the Noctuidae). The Geometridae family represented by the species *Aspitates gilvaria* being relatively rare species. Overall, the moth fauna of Branis yielded 5 species only in one site. With this result, it is evident that with further intensive works the moth diversity can be explored in greater details. Thus we believe that further studies taking into account moths' biodiversity in relation to plants richness in different sites of arid regions would bring more knowledge and will clear the host-species pattern of life as well as crop pests and endemic species. Conservation of the area's flora and plantation helps preserve a reservoir for moth and other insects but more efforts are required towards their scientific documentation and conservation.

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