Indian Journal of Entomology Online published Ref. No. e24959 DoI. No.: 10.55446/IJE.2024.1959

HOST PLANTS OF THREE SPECIES OF LOCUSTS FROM ALGERIA

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ABSTRACT

The study of the host plants of three locusts in the northern Sahara, in the Ouargla basin, was conducted at two sites: the palm grove of the National Institute of Higher Training in Saharan Agronomy (INFSAS) and the pilot farm at Hassi Ben Abdellah. In the first site, 6 out of 9 plant species were consumed by the grasshoppers; *Pyrgomorpha cognata* (Krauss, 1877) consumed 6 species, with *Imperata cylindrica* being specific to males. *Acrotylus patruelis* (Herrich-Schaffer, 1843) consumed 4 species, with a maximum occurrence of 100% for *Cynodon dactylon* in females. *Ochrilidia gracilis* (Krauss, 1902) utilized only the Poaceae family, with 100% occurrence for *Cynodon dactylon* and *Imperata cylindrica*. At Hassi Ben Abdellah, the 5 plant species were consumed; *Pyrgomorpha cognata* fed on 4 species, with *Melilotus indica* specific to females. *Acrotylus patruelis* consumed 4 species, 2 of which were common to both sexes. *Ochrilidia gracilis* females consumed more species than males, who fed exclusively on *Cynodon dactylon* with 100% occurrence.

Key words: Host plants, *Pyrgomorpha cognata*, *Acrotylus patruelis*, *Ochrilidia gracilis*, *Cynodondactylon*, *Imperata cylindrica,* frequency of occurrence, recovery rate, Sahara, Ouargla, Algeria

Locusts have always been considered as courge and a natural disaster. The most feared are considered as intermittent pests, the others take regularly, each year, a fraction of the expected harvests, Furthermore, a locust chooses a plant depending on certain substances that stimulate or inhibit food intake (Meriem et al., 2021). In many parts of Africa and Asia in particular, foodsecurity is essentially based on crop protection. The latter are subject to endemic attacks by locusts, in this case grasshoppers and locusts, which are well known for their ability to invade fields in myriads and devastate crops in their path (Saizonou, 2000). Algeria, by its geographical location, occupies a prominent place in the habitat air of these locusts. There are several gregarious species and many others that are not gregarious or grasshoppers which sometimes cause very significant damage to different crops (Doumandji et Doumandji-Mitiche, 1994). Food is an important ecological factor whose quality and accessibility play a role in modifying various parameters of Orthoptera populations, such as fecundity, longevity, speed of development and birth rate (Dajoz, 1982). To identify the phenomena of competition and pullulation of locusts, the study of their diet is of great interest (Benhalima, 1983). It makes it possible to determine the preference of alocust towards weeds or cultivated plants. This study aims to know the food preferences of three species of grass hoppers viz., *Pyrgomorpha cognata*, *Acrotylus patruelis*, and *Ochrilidia gracilis* in the basin of Ouargla located in the northern Sahara.

MATERIALS AND METHODS

The Ouargla basin, located at the bottom of Oued Mya in the Saharan bioclimatic stage, features mild winters and is an oasis dominated by date palm cultivation. For studying the host plants of three acridid species were two sites. Modern palm grove of INFSAS (31°57'N, 5°18'E) and the Hassi Ben Abdellah pilot farm (32°52'N, 5°26'E). The plant species coverage rate in a transect was measured to assess selected each plant's importance. Faecal samples from 53 locusts (18 *P. cognata*, 14 *O. gracilis,* and 21 *A. patruelis*) were collected from two trips in March and April 2001, and the locusts were individually placed in petri dishes to collect their excrement. According to Benhalima (1983), it takes 7 hr to collect faeces after an insect meal. It was noticed that it takes 24 hr for *P. cognata*, *A. patruelis* and *O. gracilis* to defecate and empty their digestive tract. The faeces of each individual were kept in paper cones on which with name of the species, stage of development, sex of the individual, and date and the place of capture, alongwith all the plant species of their habit at are collected to prepare references.

For the establishment of a reference epidermo the que from plants available standard method (Butet, 1985)

was followed. On each slide the origin of the faeces, the name of the station, the stage of the individual andits date of capture were noted. The principle of this technique as shown by Butet (1985) consists of not in g the presence and absence of plant species in the faeces of the individuals examined. The frequency of occurrence of plant epidermis contained in the faeces F%=ni/ N×100, where ni is the number of times the fragments of plant are observed, N is the total number of individuals examined.

RESULTS AND DISCUSSION

The results concerning the frequency of plant species found in the faeces of locusts at the INFSAS station are presented in Table 1. Of the 9 plant species present, 6 were ingested; *P. cognata* consumed all 6 species, with sex-based preferences: males preferred *Imperata cylindrica*, while females favored *Franckenia pelverulenta* and *Tamarix gallica*; *A. patruelis* consumed 4 species, with higher frequencies noted in females, especially *Cynodon dactylon*. Ould El Hadj (1992) notes that *A. patruelis* consumes 9 plants among the 17 present, i.e. 52.9% of all the plant species present. The species consumed are all Poaceae. According to Doudou et Fekhar (2022) in the Ghardaia region, the study of the frequency and dietary spectrum of *Acrotylus patruelis* shows that this grasshopper utilizes 81% of the plant species present; *O. gracilis* only consumed two Poaceae species, both with a 100% occurrence in both sexes. Zergoun (2020) notes that among the six Poaceae consumed by *O. gracilis* a consumption rate was high for *Cynodon dactylon* and *Setaria verticillata*. At the Hassi Ben Abdellah pilot farm, the 5 plant species present were exploited by the three locusts; *P. cognata* ingested 4 species, with males focusing on three, while females consumed all four, showing a preference for *Melilotus indica*. Kherbouche et al. (2011) specify that the plant species less appreciated by both sexes of *Schistocerca gregaria* is *Allium cepa*. Zergoun (2020), observed that *P. cognata* prefers *Mentha pelegium* and *Solanum lycopersicum*; *A. patruelis* consumed 4 species across Fabaceae, Poaceae, and Euphorbiaceae, with similar sex-based preferences as observed at INFSAS; *P. cognata* selects 6 species across 5 families; and plants consumed by females is higher than males. Raccaud-Shoeller (1980) shows that in females food intake is one of the most important factors in triggering ovarian activity. *A. patruelis* consumes 4 species at the INFSAS station and 4 at the pilot farm, demonstrating a relationship between mobility and dietary diversity; *O. gracilis* shows a marked preference for Poaceae, focusing on *Cynodon dactylon* and *Imperata cylindrica.* The study of host plants of Orthoptera in the wild helps determine whether a grasshopper targets weeds or cultivated plants (BASSA et HABCHI, 2020). Similarly, Benfekihandal (2002) specify that individuals of *Locusta migratoria* have a preference for *Avena sterelis* and *Sorghum vulgare* in the Algerian Sahara. According

Table 1. Plant species consumed and frequency of occurrence in the faeces (males and females) of three acridids

Families botanicals	Plant species	Recovery rate in %	Frequency of occurrence of plant fragments in faeces %					
			P. cognata		*A. patruelis*		*O. gracilis*	
			Mâle	Femelle	Mâle	Femelle	Mâle	Femelle
INFSAS Station								
Palmaceae	*Phoenix dactylifera*	39,86						
Poaceae	*Cynodon dactylon*	3,19	71,42	50	50	100	100	100
	Imperata cylindrica	0,33	57,14		75	80	100	100
Asteraceae	*Reicardiadispar*	0,08						
Chenopodiaceae	*Suaeda Fructose*	0,96	57,14	100				
Fabaceae	*Medicagohispida*	0,49	71,42	100	75	80		
Francheniaceae	*Franckenia pelverulenta*	0,23		83,83				
Convolvulaceae	*Convolvulus arvensis*	0,54						
Tamaricaceae	*Tamarix gallica*	0,14		16,16	75	80		
Total Recovery Rates		45,82						
Liliaceae	*Allium Cepa*	10,10	50	66,66				
Poaceae	*Cynodon Dactylon*	2,28			80	72,42	100	100
Fabaceae	*Mellilotus Indica*	4,90		33,33	80	85,71		66,66
	Medicagohispida	0,69	100	100		100		33,33
Euphorbiaceae	*Mercurialis Annua*	0,79	100	100		85,71		
Total Recovery Rates		18,76						

to Zergoon et al (2020), *Hetteracris littoralis* consumed 12 plant species and mainly selected Cucurbitaceae and Solanaceae.

The frequency of plant species in the faeces of Acrididae varies, with each species exhibiting distinct food preferences. The locusts seek to compensate for water deficits in arid environments, emphasizing the importance of plant water balance in their food selection. Three species are ingested by both sexes and one species is specific to the diet of males, it is *Imperatacy lindrica*, while the other two are preferred by females, which are *Franckenia pelverulenta* and *Tamarix gallica*; plants consumed by females is greater than that by males. This phenomenon has been confirmed by several authors on Caelifera, among others those of Doumandji-Mitiche et al. (1993) in *Dociostauru smaroccanus*, Doumandji-Miticheetal (1996) in *Shistocerca gregaria* and Salmi (2022) in *Aiolopus strepens*. According to Dajoz (1982), food is one of the important ecological factors whose quality and accessibility play a role in modifying various parameters of Orthoptera populations, such as fecundity, longevity, speed of development and rate of death. In the arid region the plant species consumed must provide the essential elements and in particular the necessary water, to compensate for a water deficit caused by high temperatures. According to Ould El Hadj (2002) the locust looks for food that is poor in water in a humid environment and rich in water in a dry environment.

ACKNOWLEDGEMENTS

The authors thank the staff of the National Institute for Higher Education in Saharan Agronomy (INFSAS) and the staff of the pilot farm of Hassi Ben Abdellah.

FINANCIAL SUPPORT

This work not supported by any funding sources.

AUTHOR CONTRIBUTION

All authors read and approved the final manuscript.

CONFLICT OF INTEREST

No conflict of interest.

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(Manuscript Received: January, 2024; Revised: August, 2024;
Accepted: August , 2024; Online Published: September, 2024)
Online First in www.entosocindia.org and indianentomology.org Ref. No. e24959