Bull. Fac. Agric., Cairo Univ.,53 (2002):129- 140.

FIRST REPORT IN EGYPT OF TWO SEED-BEETLES (COLEOPTERA: BRUCHIDAE) NOXIOUS TO *Prosopis* SPP.

(Received:27. 6. 2001)

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ABSTRACT

Two insects (Coleoptera: Bruchidae) which develop in the larval stage within the seeds of *Prosopis* trees are reported for the first time in Egypt. *Algarobius prosopis* originates from the southern part of U.S.A., and *Mimosestes amicus* occurs in U.S.A., Mexico, Hawaii and Costa Rica. Both introduced species have been previously recorded from other areas of the Near East, and their range seems to be expanding to the west. Preliminary data on their abundance in Egypt are given, together with a key to the three New World Bruchidae presently established on Mimosoideae and Caesalpinioideae.

***Key words**: Algarobius prosopis , bruchidae , Mimosestes amicus, Prosopis glandulosa, Prosopis juliflora, seed-beetles.*

1. INTRODUCTION

Prosopis is a New World genus of medium-sized trees, bushes or herbaceous plants belonging to the Fabaceae (Leguminosae) family, Mimosoideae subfamily. *Prosopis* trees are useful as firewood and timber, and their pods and foliage are valuable sources of protein for cattle and wild animals . Because of their ability to colonize dry

areas, several species of *Prosopis*, particularly *P. juliflora* (Swartz) DC., *P. glandulosa* Torrey (known as "mesquite") and *P. velutina* Wooton, have been introduced in many arid or semi-arid regions of the world, particularly in Egypt (Burkart, 1976a & b).

In the New World, *Prosopis* seeds are fed upon by several bruchids, notably in the genera *Algarobius*, *Caryedes*, *Mimosestes*, *Neltumius*, and *Rhipibruchus* (Johnson, 1981). In the beginning of 2001, we collected pods of two species of *Prosopis*, namely *P. glandulosa* and *P.juliflora*, in two areas of Egypt. These pods yielded two bruchid species, which are reported for the first time in this country.

2. MATERIAL AND METHODS

Two pod samples were collected between January and April 2001 from each of a *P. glandulosa* tree located near El Matar, Bahareya oasis, and a *P. juliflora* tree located in the outskirts of El Tur (Sinai). Sample size and sampling interval depended on the availability of pods in the trees. Each sample consisted of 32 to 133 ripe or nearly ripe pods (Table 1). Healthy pods (without emergence hole) and pods with emergence holes were counted. They were maintained in aerated plastic boxes at laboratory temperature (26 to 31°C) and relative humidity (70 to 80%). Boxes were checked daily for adult emergence until one month after last emergence. Genitalia were dissected and beetles were identified using Kingsolver & Johnson's (1978) and Kingsolver's (1986) revisions of the genera *Mimosestes* and *Algarobius*, respectively.

3. RESULTS

No infestation (emergence holes or emerged beetles) was noticed in the first sample collected in Bahareya (Table 1). The three other samples were infested by bruchids, and a total of ten *Algarobius prosopis* (LeConte) and one *Mimosestes amicus* (Horn) were recovered. *A. prosopis* was the dominant species in El Tur, and was the only species present in the Bahareya sample.

At the end of the experiment, 0.8 to 24.4% of the pods showed emergence holes, and the number of holes in a single infested pod

ranged from 1 to 7. Emergence holes were more or less circular, 0.45 to 0.72 mm in diameter, with sharp and neat edges. There was no detectable difference in hole size between the two species.

Table (1) : Occurrence of Bruchid species in samples of *Prosopis* spp. collected in Bahareya and El-Tur.

Region	Collection dates	*Prosopis* species	Number of collected pods	Number of emerged beetles	Number of emergence holes	% infested pods
Bahareya	9 January	*Glandulosa*	100	0	0	-
	8 April	*Glandulosa*	133	*1 A.prosopis*	1	0.8%
El Tur	15 March	*Juliflora*	32	*3 A.prosopis*	17	3.1%
	27 April	*Juliflora*	41	*6 A.prosopis 1M.amicus*	12	24.4%

4. DISCUSSION

Obviously, the small size of samples studied here and their random nature do not allow firm conclusions as to the distribution and abundance of the two bruchid species new to Egypt. Our data reveal, however, the presence of two seed beetles that could be harmful to the natural regeneration of *Prosopis* and other trees belonging to the leguminous genera *Acacia, Caesalpinia, Cercidium,* and *Parkinsonia. Mimosestes amicus* is naturally present in Southern U.S.A., Mexico, Hawaii and Costa Rica. Its host plants are, among Mimosoideae: *Acacia farnesiana, A. constricta, A. cochliacantha* (=cymbispina), *A. pennatula, Prosopis juliflora* (or glandulosa?), *P. pallida, P. palmeri*; among Caesalpinioideae: *Parkinsonia* (*Cercidium*) *florida, P.praecox, P. aculeata, Cercidium microphyllum* (Kingsolver & Johnson, 1978), as well as *Prosopis velutina* (Johnson 1987). Zacher's (1952) list of host plants of *M. amicus* comprises several other *Prosopis* species as well as *Caesalpinia coriaria* and *Senna (Cassia) occidentalis*, but these records are highly questionable (Kingsolver & Johnson, 1978). The first record of *M. amicus* outside the New World is by Anton *et al.*,(1997), who indicated its presence in Israel, Jordan valley, Dead Sea area, Arava valley and northern Negev.The beetle was obtained from seeds of *P.juliflora* and also from an unidentified *Acacia* species

between January and June and in November.

Algarobius prosopis originates from southern U.S.A. (from Texas to Baja California). It has a more restricted host range, and develops only in the seeds of *Prosopis* trees: *P. glandulosa*, *P. palmeri*, *P. velutina*, *P. pubescens* and *P.reptans* (Kingsolver, 1986). This bruchid was probably introduced accidentally in the Arabic Peninsula with seeds of *Prosopis* introduced for reforestation purposes. Decelle (1990) recorded it from Saudi Arabia (Hofuf) in 1980; in Dubai in 1983; in Yemen (Lahej, north of Aden) in 1987 (Fig. 1). According to Decelle , *A. prosopis* may have been adapted also to *Acacia nilotica* seeds in Dubai, but this remains very doubtful. It was introduced in southern Africa (together with *A. bottimeri* and *Neltumius arizonenis*) as a biological agent for the control or containment of invasive *Prosopis glandulosa* var. *torreyana* and *P.velutina* in grazing farmland and protected areas with extremely fragile native ecosystems. It was established in the Northern Cape Province and other parts of the Republic of South Africa since 1987 (Coetzer & Hoffmann, 1997).

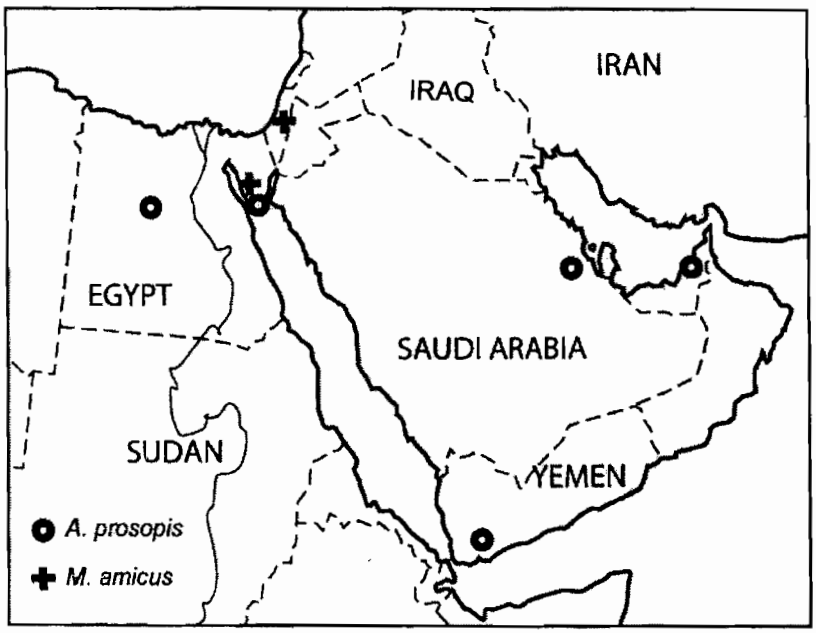

Fig.(1): Distribution map of *Algarobius prosopis* **and** *Mimosestes amicus* **in the Near East.**

Another new world bruchid, *Mimosestes mimosae* (F.) is reported from Egypt by Kingsolver and Johnson (1978) who reviewed its identity, distribution and host plants. Its native range in the New World includes Mexico, most Central American countries, as well as Guiana and Brazil. Its host plants are Mimosoideae: *Acacia cochliacantha*, *A. farnesiana*, *A. pennatula*, *A. hindsii* (and a hybrid *hindsii x pennatula*), *A. macracantha*, and Caesalpinioideae: *Caesalpinia coriaria*, *C. sclerocarpa*, *Ceratonia siliqua*. Johnson (1987) added to this list *Acacia globulifera*.

M.mimosae was erroneously recorded by Xambeu (1896), Hoffmann (1945) and Zacher (1952) infesting seeds of cultivated Faboideae such as *Phaseolus vulgaris* (bean), *Vicia faba* (broad bean) and *Cicer* (chickpea). These records actually refer to the common bean weevil, *Acanthoscelides obtectus* (Say). Shomar (1963) followed Hoffmann and mentioned the presence of *Acanthoscelides* (= *Mimosestes*) *mimosae* in Egypt. In fact, the true *M. mimosae* is very accidentally found outside the New World, and is established only in Grand Canaria and Sicilia (Decelle and Lodos, 1989). The only reliable Egyptian record of *M. mimosae* is a single specimen by Shomar (1963) under the name *Bruchidius dominicanus* (Jekel), a junior synonym of *M. mimosae* (Kingsolver and Johnson, 1978). Anton *et al.*, (1997) also mention the presence of *M. mimosae* in Egypt, without any indication of host plant relationship.

It may be mentioned that a third bruchid of the New World origin is established in Egypt, as well as in other Mediterranean countries, on Mimosoideae and Caesalpinioideae:*Pseudopachymerina spinipes* (Erichson). It originates from South America: Argentina, Brazil, Chile, Peru, and Ecuador (Johnson & Siemens, 1997) and was introduced into many areas of the Old World with its host plants , *Ceratonia, Caesalpinia* and *Acacia* spp., particularly *A. farnesiana* (L.) Willd. (Shomar, 1963, Anton *et al.*, 1997, Decelle & Lodos, 1989). Formerly known as *Pachymerus* (or *Pseudopachymerus*) *lallemanti* Marseul, it is easily distinguished by its swollen hind femur, with a subapical pecten of four to five spines (Fig. 2c).

A few well-documented examples (Wilson, 1969; Samways, 1994; Fabres & Nenon, 1997) indicates that insects introduced in a new area may experience a massive increase of their populations, especially when their host plant is itself a recent invader and lacks its

native enemies. A decline in population levels usually follows after a few years, for reasons which are not quite well understood, but may well be related with the attack of local parasitoïds or parasites. No parasite has so far been recorded on either introduced bruchid, and it may be expected in the near future that their distribution will expand, with increasing population levels.

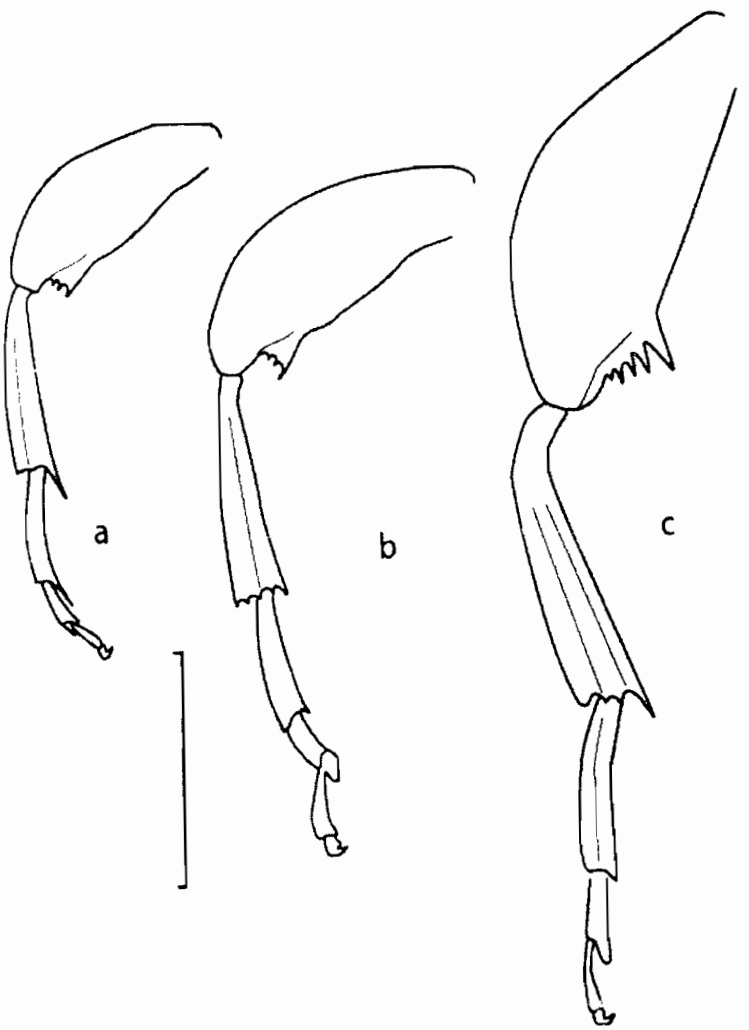

Fig.(2): Hind leg (external view)of (a) *Algarobius prosopis*,**(b)** *Mimosestes amicus*, **(c)** *Pseudopachymerina spinipes* **(scale:1 mm).**

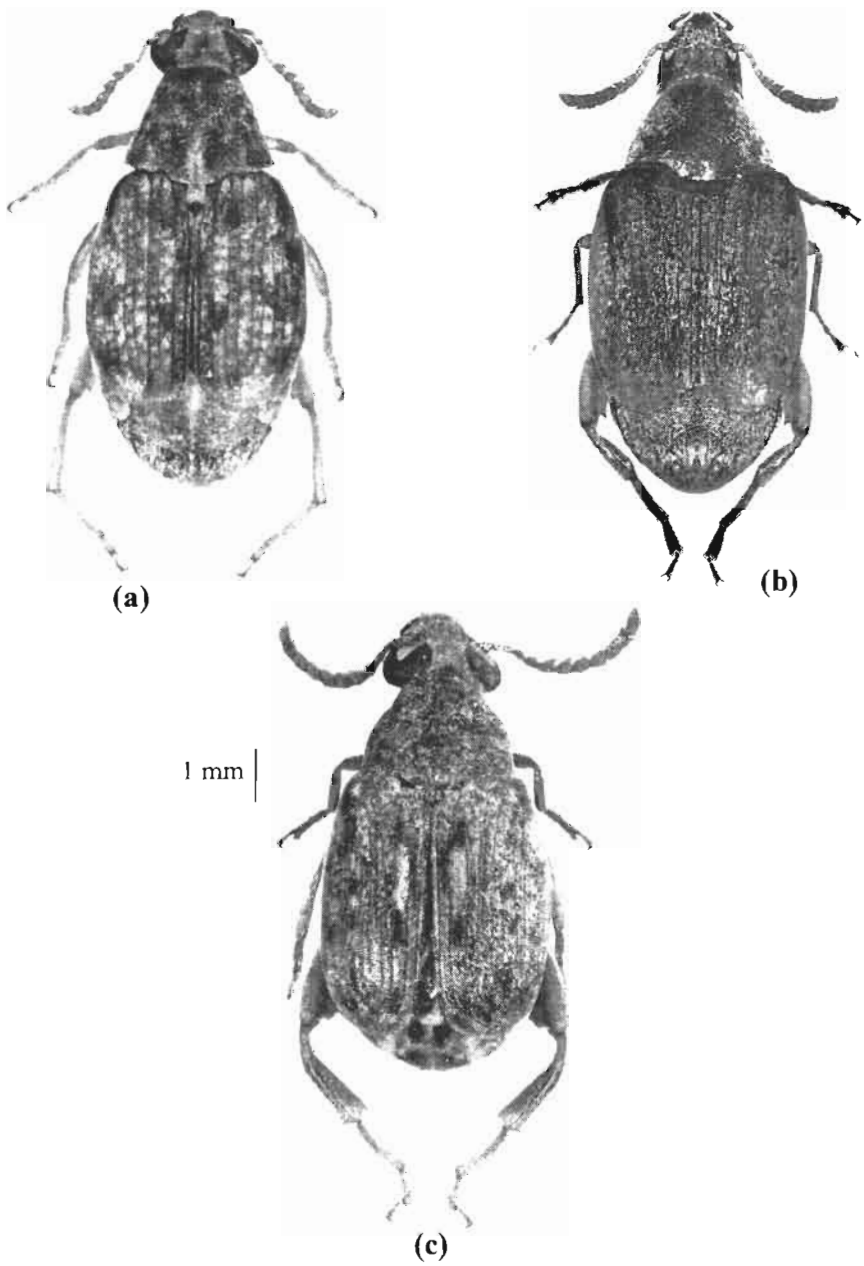

Fig. (3) : Adults of the three introduced species (female specimens).
(a) *Algarobius prosopis* (LeConte).
(b) *Mimosestes amicus* (Horn).
(c) *Pseudopachymerina spinipes* (Erichson).

In order to facilitate their monitoring, a key for the identification of bruchids introduced in Egypt and likely to be found predating the seeds of Mimosoideae (*Acacia, Prosopis*) and Caesalpinioideae (*Ceratonia, Caesalpinia*, etc.) is provided here. It is based on the external morphological characters only and can therefore be implemented without dissection of the genitalia.

Key to the New World Bruchids established on Mimosoideae and Caesalpinioideae in Egypt

1 - Hind femur swollen, ventrally with a row of 4 to 5 spines (Fig. 2c). Pronotum with lateral carina distinct. Stout species (4 to 5mm), mainly dark brown with black spots. Eyes bulging (Fig.3:c)

Pseudopachymerina spinipes

- Hind femur not swollen (Fig 2a and b). Pronotum without larteral carina. Smaller species (2 to 4mm)

2 - Scutellum rectangular, about twice as long as wide, ending in two distinct spines. Colour yellowish to dark brown and reddish, with whitish pubescence. Legs and antennae pale brown. Female pygidium with two short vertical sulci, black and shining, near (but not reaching) the apical edge. Head without glabrous area on the vertex. Eyes globular, distincly bulging. Hind tibia with a long mucro (Fig. 2a and 3a)

Algarobius prosopis

3 - Scutellum square or shorter than wide. General colour black, with a few reddish areas, particularly the apical part of femora. Pygidium black, with whitish pubescence. Head with a glabrous area on vertex. Eyes flat, not bulging. Mucro much less developed (Fig. 2b and 3 b)

Mimosestes amicus

The long-term impact of the two species newly reported here is yet impossible to forecast. Further studies would be needed to assess the effect of seed predation by bruchid beetles on the status of

Prosopis glandulosa and *juliflora* in Egypt. It would also be useful to monitor the possible invasion of other possible hosts, such as native and introduced species of Acacia or Caesalpinioideae. It should also be stressed that the presence in Egypt of these two seed feeders may in the future represent a threat to *Prosopis* stands in the Sahelian parts of Northern and Western Africa.

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تسجيل لأول مرة فى مصر لإثنين من خنافس البذور التابعة لرتبة غمدية الأجنحة عائلة Bruchidae يصيبان الأشجار من نوع *Prosopis*

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ملخص

سجلت الدراسة الحالية و ذلك لأول مرة فى مصر تواجد نوعان حشويان ينتميان لعائلة حشرات خنافس Bruchidae التابعة لرتبة الحشرات غمدية الأجنحة Coleoptera و التى تنمو أفرادها فى خلال الطور اليرقى داخل بذور أشجار الـ Prosopis. النوع الأول و هو *Algarobius prosopis* و أصل منشأه الجزء الجنوبى من الولايات المتحدة الأمريكية ، أما النوع الثانى و هو *Mimosestes amicus* فيوجد فى الولايات المتحدة الأمريكية و المكسيك و هاواى و كوستاريكا.

و قد سبق تسجيل كلا النوعين من مناطق أخرى من الشرق الأدنى ، و يبدو أن مدى هذه الأنواع يكون ممتدا إلى الغرب . و قد توفرت البيانات الأولية عن وفرة هذه الأنواع فى مصر ، مع مفتاح تقسيمى لثلاثة أنواع حشرية من عائلة Bruchidae فى العالم الجديد ، أسس حديثا على تحت عائلتى Mimosideae ، Caesalpinioideae .

المجلة العلمية لكلية الزراعة – جامعة القاهرة – المجلد (٥٣) العدد الأول (يناير ٢٠٠٢):١٢٩-١٤٠.