ERIOCEREOPHAGA HUMERIDENS [COL.: CURCULIONIDAE],
A POTENTIAL AGENT FOR THE BIOLOGICAL CONTROL
OF ERIOCEREUS MARTINII [CACTACEAE] IN AUSTRALIA

R. E. McFADYEN (1)
C.I.B.C., South American Sub-Station
Tucuman, Argentina

The weevil *Eriocereophaga humeridens* O’BRIEN attacks the cactus *Eriocereus adscendens* (GURKE) in N.E. Brazil. Laboratory tests and field observations demonstrate that it will also accept *Eriocereus martinii* LAB. as host, and does not damage plants except in the sub-family Cereanae of the Cactaceae. Young plants and regrowth are preferentially attacked and larval feeding in *E. martinii* results in the death of attacked stems. *E. humeridens* was approved for liberation in Queensland, Australia in February 1976, for the control of *Eriocereus* spp., and field releases were made in 1976.

*Eriocereus martinii* LAB., Harrisia cactus, is a major weed in Queensland, Australia, at present being controlled at high cost by chemical and mechanical means (MANN, 1967). It is native to the Chaco of Argentina and Paraguay in South America, and 3 insect species attacking *Eriocereus* in this area have been introduced into Australia as potential agents for biological control (McFADYEN & FIDALGO, 1976; CRUTTWELL, unpubl. report, 1975; McFADYEN, unpubl. report, 1976).

A related cactus, *Eriocereus adscendens* (GURKE), occurs in the thornbush scrub of northeast Brazil and the insects attacking it were surveyed in 1974 and 1975. The cryptorhynchine weevil *Eriocereophaga humeridens* O’BRIEN was considered promising and a nucleus population brought to Tucuman for detailed investigation.

IDENTIFICATION, HOST AND DISTRIBUTION RECORDS

*Eriocereophaga humeridens* is at present the only described member of this new genus, sub-tribe *Tylodina* (*Cryptorhynchini, Curculionidae*) that is close to the genus *Gerstaekeria*, cactus weevils occurring in the southern USA, Mexico, Ecuador, and Peru (O’BRIEN, 1976).

*E. humeridens* occurs on the cacti *E. adscendens, Cereus jamacaru* DE Candolle and *Cephalocereus gounellei* (WEBER), in the sub-arid scrub of north-eastern Brazil from the Pernambuco/Paraibo border (8oS), to near Jequie, Bahia, (13oS), a distance of 800-900 km. It was not found during investigations in Paraguay and northern Argentina (McFADYEN, unpubl. reports, 1975-76).

(1) Formerly CRUTTWELL, present address: Sir Alan Fletcher Research Station, Dept. of Lands, P.O. Box 36, Sherwood, Qld., Australia, 4075.
E. martini and Cereus validus Haworth, native to northern Argentina, do not occur in the distribution area of the weevil, but E. humeridens developed normally on these in the laboratory.

DESCRIPTION OF STAGES

ADULT: A detailed description is given by O'Brien (1976). 9-12 mm long, 5-6 mm across the elytra, body and head black, elytra light brown with black markings; legs and elytra covered with pale golden-brown scales; hind wings lacking; abdomen, except for last 3 visible segments, fused laterally to elytra. When disturbed, produce a "chirping" sound by rubbing the tip of the abdomen against the elytra. Sexes indistinguishable except by examination of genitalia.

EGG: 1.5-2 mm in diameter, white, oval with a thick pitted chorion; attached to cactus surface by and covered with mass of faeces 3-5 mm in diameter.

LARVA: Newly-hatched 3.5 mm long, pale yellow with brown head capsules; mature 18-22 mm long by 5-6 mm wide, yellowish-white with brown head. Pupa, initially pale cream, subsequently darkening, 9-11 mm long, 5-6 mm wide; male and female pupae distinguished by penultimate abdominal sternite; in the female with 2 nippleshaped protuberances, absent in male; 8th tergite of teneral adult within mature female pupae greatly elongated.

LIFE HISTORY

The nocturnal adults commence activity at dusk and return to ground level at or shortly after dawn; during the day they remain concealed among grass-stems or in leaf-litter.

The adult weevils prefer young tissue for feeding; eggs are laid on old or young tissue. Females rarely lay more than 1 egg per night, most eggs being laid within 2 h of dusk, in irregularities on the cactus, such as old damage, near spine-bases, in the fork between 2 branches, between the spines on a stem-tip, etc. Both in the laboratory and the field, individual females show preferences for a particular type of oviposition site, e.g. stem-tips, and consistently lay most eggs at such sites.

In the field, eggs are covered by a 0.5-1 mm thick layer of fine earth and faeces excreted by the ovipositing female. Laboratory studies showed that gravid females ingested earth every night, although ovipositing on average every other night. Their ordinary faeces also contain earth. Ingestion of earth occurs when activity commences shortly after sunset, before the females ascend the plant to feed and oviposit, rarely when females descend at dawn, and never during the day when they are resting. Males and preovipositional females do not eat earth. The earth passes through the female digestive system in 8-12 h; sand grains up to 1.2 × 0.6 mm may be eaten and excreted without damage.

When ovipositing, the female adopts a characteristic position; poised on fully-extended legs, the tip of the abdomen is extended and the egg placed onto the selected site. The egg is then covered with faecal matter, and back and forward movements of the modified 8th tergite shape the faeces into a smooth mass covering the egg and firmly fixing it to the cactus. The process takes 15-20 min; neither egg nor oviposition site is touched by the mouth-parts or feet.

At temperatures of 25-30°C eggs hatch in 14-20 days, the larvae immediately entering and feeding in the cactus. Initially feeding is restricted to an area about 1 cm diameter, but subsequently the area is extended, and affected tissue reduced to a mucilaginous