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Damage caused by *Peltophorus polymitus* (Boheman 1845) in maguey leaves in the state of Hidalgo

Daños ocasionados por *Peltophorus polymitus* (Boheman 1845) en hojas de maguey en el estado de Hidalgo

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Abstract

Maguey has been used since ancient times as a source of food, drink, clothing, religious use, decoration, furniture, tools, medicine and in construction. In this research, the damage caused by the mouthparts of adult insects on the upper and lower sides of maguey leaves was analyzed. It is concluded that adult *P. polymitus* insects feed on the leaves of agave plants, causing the same damage to the upper and lower surfaces. This means that there is no feeding preference for any side of the leaf and so far, the damage caused by this beetle does not seem very important. However, these wounds caused during feeding can encourage the entry of fungi or bacteria and cause disease.

Maguey, Beetle, Agave, Coleoptera, Hidalgo

Resumen

El maguey se ha utilizado desde tiempos muy antiguos como fuente de alimento, bebida, vestido, uso religioso, ornato, muebles, herramientas, medicina y en la construcción. En esta investigación se analizó el daño ocasionado por el aparato bucal de insectos adultos en el haz y envés de hojas de maguey. Se concluye que los insectos adultos de *P. polymitus* se alimentan de las hojas de plantas de agave, ocasionando el mismo daño en el haz y en el envés. Esto significa que no existe preferencia alimenticia por alguna cara de la hoja y hasta el momento, los daños causados por este escarabajo no parecen muy importantes, sin embargo, estas heridas ocasionadas durante su alimentación pueden propiciar la entrada de hongos o bacterias y causar una enfermedad.

Maguey, Escarabajo, Agave, Coleoptera, Hidalgo

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Introduction

Mexico is a centre of diversity for Agave, with many native and commercial species with local species of regional and international impact (Figueroa *et al*., 2016).

The Agavaceae family occurs naturally in the Americas. Agaves are found from Alberta, Canada; North Dakota in the United States, Mexico, Central America and as far south as Venezuela, the Guianas, Colombia, Ecuador, Peru, Bolivia and Paraguay; it also grows in the Caribbean islands (Garcia, 1992).

Approximately 310 species are reported in the Americas, and 272 in Mexico, which is considered the centre of origin of the genus with 88% of the species. Its true production area is cooler than temperate and it grows between 2,200 and 2,700 m.

It is a plant that withstands prolonged periods of drought. It is a plant that resists the prolonged droughts and inclemencies of the semi-arid zones of the states of Hidalgo, Tlaxcala, Mexico and Puebla, where it often rains only once a year, but where frosts are very strong and frequent in the autumn and winter seasons. Maguey has been used since ancient times as a source of food, drink, clothing, religious use, ornament, furniture, tools, medicine and in construction (Narváez *et al*., 2016).

Coleoptera (beetles) are the most diverse order of insects, with approximately 400,000 described species worldwide, of which 3.29% are found in Mexico. Curculionidae with 18 subfamilies, 90 tribes and about 60,000 species distributed worldwide is the most diverse beetle family, the family also includes several species of economic importance because they affect stored products, forest ecosystems and agroecosystems due to their feeding habits that include roots, stems, leaves, bark, flowers, fruits and seeds (Reyes *et al*., 2020).

One of the insects that feeds on the maguey pulquero is Peltophorus polymitus, identified by a body length of 6 to 10 mm, black colour, with white scales all over the body (figure 1E-F), with prosternal canal; mandibles without teeth, endodontic; very large round eyes, dorsally contiguous; geniculate antenna with compact clava, inserted at the base of the face, funiculus of 7 antennomeres, where antennomeres 1-3 are longer than antennomeres 4-7; on the head side a slightly dorsoventrally compressed, medium-sized rostrum; pronotum subtrapezoidal; scutellum trapezoidal; elytra with strongly emarginate base; anterior coxae separated by a prosternal canal; tarsomere 3 strongly bilobed, with abundant silk on the entire ventral surface, without dermal lobes, with a pair of claws attached at the base; pygidium exposed behind the elytra (Romo *et al*., 2012). The aim of this research was to evaluate the damage caused by the mouthparts of adult pinto beetle insects on the upper and underside of maguey pulquero leaves.

Methodology

The locality of Epazoyucan is located in the state of Hidalgo at the coordinates (19° 59' 47.92" N, 99° 40' 40.5" W; 2,419 m.a.s.l.). During 2021 and 2022, maguey stalks damaged by the mouthparts of the pinto weevil were sampled (Figure 1 A-D). Adult insects of the insect P. polymitus were also collected in bottles with 70% alcohol for determination and preservation. The material was analysed in the Entomology laboratory of the Universidad Politécnica Francisco I. Madero, located in Tepatepec, Hidalgo. Using a completely randomised design and Tukey's comparison of means, the damage caused by the mouthparts of adult insects on the upper and lower side of the stems of the *Agave* (Sas 2001).

Results

In this research we found that the damage present on the leaves of maguey pulquero (figure 1 C and D) is caused by adult insects. They feed on the leaves of the agave plant and leave small circular holes on the surface of the stalk without going through it. González et al., 2015, mention that during feeding and oviposition they can also generate small holes in the floral scape or quiote.

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The adult is on average 8 to 10 mm long, black with white scales (figure 1 E-F) all over the body, with a posternal canal to receive the rostrum at rest; the eyes are round and large; the antenna geniculate, with compact clava, inserted at the base of the rostrum, the antennal funiculus is of seven antennomeres; anterior coxae separated by the posternal canal, tarsomere 3 strongly bilobed; the elytra are strongly sclerotized, striated and with pubescence; pygidium exposed (González *et al*., 2015).

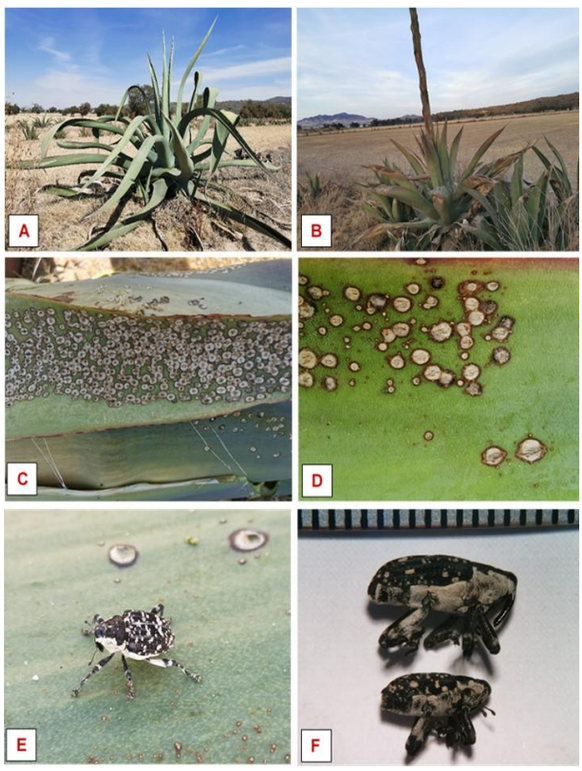

Figure 1 Damage caused by Peltophorus polymitus on maguey pulquero leaves in the state of Hidalgo. (A-B) maguey host of the pinto weevil, (C-D) symptoms caused by the mouthparts of the adult insect when feeding and (E-F) adult insects, the size of the sexual dimorphism was shown

Reyes *et al*., (2020), mention that P. polymitus is a species widely adapted to different vegetation types, altitudes and, therefore, tolerant to diverse environmental conditions since it was recorded in all ecoregions of the State of Durango.

Beam of the maguey leaf	Sampling 1	Sampling 2	Sampling 3	Average
Maguey leaf underside	5	8	7	6.6 a
	4	5	2	3.6 a
	10	12	7	9.6 a
	9	11	7	9.0 a
	3	4	5	4.0 a
	6	6	3	5.0 a
	8	7	10	8.3 a
	6	7	6	6.3 a
	4	4	2	3.3 a
	9	6	6	7.0 a
Values with the same letter are statistically equal at P>0.05.				

Table 1 Number of lesions caused by adult insects of P. polymitus on the upper and lower surface per four square centimetres on maguey leaves

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Conclusions

From this research it is concluded that adult insects of P. polymitus feed on the leaves of agave plants, causing the same damage on the upper and lower sides. This means that there is no feeding preference for any side of the leaf and so far the damage caused by this beetle does not seem to be very important in maguey pulquero, however, these wounds caused during feeding can lead to the entry of fungi or bacteria and cause a disease that causes the death of the plant.

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