PRESENCE OF REDUCING SUGARS, CRUDE FIBER AND PHYTOALEXINS IN RESISTANT AND SUSCEPTIBLE TO BEAN POD WEEVIL (*Apion godmani* Wagner) COMMON BEAN GENOTYPES.

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INTRODUCTION. Bean pod weevil (*Apion godmani* W.) is a bean (*Phaseolus vulgaris* L.) insect pest distributed in El Salvador, Guatemala, Honduras, México and Northern Nicaragua. This insect oviposites in developing pods. The adult female chews a small hole in the mesocarp of the pod and its larvae feed on the developing seeds (McKelvey et al., 1951). Jacinto-Hernández and Garza-García (1994) showed there is a tendency for the insect to prefer pods with higher sugar content while fiber content in the pods is not related to insect attack. With microscopy Garza (1990) observed bean tissue oviposited by *A. godmani* and detected that resistant materials produce an encapsulation of the egg, in which necrotic tissue around the oviposition site prevent larva emergence. Soriano and Medina (1989), reported that Mexican bean varieties were able to accumulate phytoalexin, phaseollin (antimicrobian compound) in response to any aggression by biotic agents. The objective of this study was to compare breed and landrace bean genotypes with different response to *A. godmani* attack, in terms of reducing sugar and crude fiber content and its capacity to accumulate phaseollin.

MATERIAL AND METHODS. Sowing of bean (*P. vulgaris*) cvs. Amarillo-154, Amarillo-155, Negro-150, J-117 (resistants) y Zacatecas-45, Jalisco-11 y Canario-107 (susceptibles), was done on May 11 and Jun 8, 1994, at Texcoco, Mexico. Pods were harvested at the development stage in which grain formation was incipient. Recently cut materials were sent to the laboratory, and width and length of pods were registered. Part of the samples was dehydrated for analysis of crude fiber and reducing sugar. For the phytoalexin analysis samples of 0.5 cm of pod tissue were taken from around the oviposition site, observing with a stereoscopic microscope.

RESULTS AND DISCUSSION. Bean pods were 5.4 to 7.3 cm long and 0.5 to 0.6 cm wide. There was no relation between size and susceptibility to bean pod weevil. Fiber content in pod showed wide variability (8.8 to 21.3 % of total weight); however there was no association with the bean pod weevil attack. Reducing sugar content ranged from 2.1 to 8.5 %; this component was affected by sowing date. Higher concentrations were detected in the second sowing date. In the first sowing date, susceptible materials showed higher sugar content than resistant ones (*r*=0.92**), while in the second sowing date no association was detected between sugar content and percentage of damaged grain. Phytoalexin analysis showed that resistant material especially J-117, had more phaseollin than susceptible genotypes (Table 1). To confirm whether the presence of phytoalexin was related to capacity of resistant materials to respond insect attack efficiently, intact pods of a resistant (Negro-150) and a susceptible (Canario-107) genotypes were inoculated with a 0.5 µg/µl solution of decagalacturonide, five µl were applied to each pod. It has been found that galacturonide stimulates phytoalexin production in bean plants (Cano et al., 1994). Pods were incubated for 17 hours at room temperature, and phytoalexin concentration was then measured. An increase in phaseollin was detected in the susceptible genotype and the total amount was similar to that observed in the resistant genotype. On the other hand the amount of phytoalexin detected in the oviposited pods was lower in the susceptible genotype than in the resistant genotype (Figure
This suggests that both genotypes are able to accumulate phytoalexins as a defense mechanism; but the presence of the insect inhibits this accumulation in susceptible genotypes making them more susceptible to other diseases.

**TABLE 1. Concentration of phytoalexins (phaseollin), in *Apion godmani* resistant and susceptible genotypes.**

<table>
<thead>
<tr>
<th>RESISTANT</th>
<th>µg phaseolin g⁻¹ fresh weight bean tissue</th>
<th>SUSCEPTIBLE</th>
<th>µg phaseolin g⁻¹ fresh weight bean tissue</th>
</tr>
</thead>
<tbody>
<tr>
<td>J-117</td>
<td>10 026</td>
<td>Canario-107</td>
<td>3 380</td>
</tr>
<tr>
<td>Negro-150</td>
<td>5 507</td>
<td>Zacatecas-45</td>
<td>857</td>
</tr>
<tr>
<td>Amarillo-155</td>
<td>1 324</td>
<td>Jalisco-11</td>
<td>1 307</td>
</tr>
<tr>
<td>Amarillo-154</td>
<td>1 635</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. Phaseolin accumulation in pods of two bean genotypes a) oviposited by *Apion godmani* b) inoculated with corn decagalaacturonide and incubated for 17 hours.

**REFERENCES**


