
MEXICAN BEAN BEETLE (*Ephilachna varivestis* Muls) RESISTANCE IN COMMON BEAN BREEDING LINES

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Mexican bean beetle (*Ephilachna varivestis* Muls) is an insect pest that severely reduces seed yield in common bean (*Phaseolus vulgaris* L.) cultivars in Durango, Mexico (Reyes-Barraza, 1989). Over the years the Instituto Nacional de Investigaciones Forestales y Agropecuarias, INIFAP (National Institute for Forestry, Animal Husbandry and Agriculture Research) has developed through plant breeding some bean cultivars that show adequate levels of *E. varivestis* tolerance. According to Wiseman (1990) and Schalk (1990) host-plant resistance is the most economic- and environmentally sound strategy to control insect pest in agriculture.

An experiment was undertaken to test a group of 500 breeding lines to determine non-preference levels to *E. varivestis* in common bean seedlings. In order to quantify non-preference, bean seedlings were grown under greenhouse conditions to be exposed to *E. varivestis* adults during the first 5 to 7 days after seed germination. 37 small experiments were conducted at "Valle del Guadiana Experiment Station, Durango, Mexico during winter-spring (1994) seasons to screen breeding lines. Each experiment consisted of series of 12 to 15 lines, three seedlings per line were grown, each in a plastic cup, distributed at random and confined in a cage to be exposed to insect adults. The insect number in a cage was one adult per fully-opened primary leaf and all the insects were allowed to choose freely either to consume or to oviposit on the growing seedlings. Insect non-preference was determined in three ways: leaf-feeding (leaf area consumption), laid egg mass and insect resting. "Negro Durango" used as a check was included in all 37 experiments since this cultivar has shown reasonable field tolerance to Mexican bean beetle. Some preliminary results on leaf area consumed are presented here.

Results from 37 experiments indicated that seedling leaf area was consumed by *E. varivestis* adults by 48% in average and ranged from 18 to 90% during the 5-7 days of exposure, while the check cultivar had around 55% of its foliage consumed. Since bean seedlings were exposed to adult insects for a period of up to 7 days, the average leaf area consumed was progressively increased every day from 12, 26, 37, 51, 65, 68, to 78%, respectively. In order to consider a resistant breeding line, we measured percent leaf area consumed by insect adults every 24 hours within a period of 5 days then compared to N. Durango's performance. Table 1 shows an example of breeding lines that were either not preferred or highly preferred by insect adults. Among all lines screened, there were 10 breeding lines that had five-times less leaf area consumed (12%) than the check cultivar (55%). In contrast, breeding lines considered highly susceptible had 70% or more leaf area consumed, that is, these plants were preferred by insect adults.

Table 1 Leaf area consumed by *Ephilachna varivestis* Muls insect adults in seedlings of common bean breeding lines.

| Experiment # | Resistant genotypes | Leaf area consumed | Susceptible genotypes | Leaf area consumed |
|--------------|--------------------------|--------------------|--------------------------|--------------------|
| | | (%) | | (%) |
| 1 | NG 91007 ^a | 18 | 1693 Mad-4 | 60 |
| 8 | N. Durango ^b | 22 | PT 91346 | 76 |
| 15 | 2274 Mad-23 ^c | 37 | 1715 Mad-5 | 77 |
| 19 | 2066 Mad-20 | 4 | 2651 Mad-38 | 35 |
| 28 | NG 91147 | 43 | PT 91047 | 76 |
| 37 | PT 91300 | 32 | 3386 All-26 ^d | 71 |
| | Average | 26 | | 66 |

a: NG = black type, PT = pinto type

b. Check cultivar

c Mad = Breeding lines selected at F.I. Madero Experiment Station, Durango, México

d: All = Breeding lines selected at I Allende, Durango, México

Selected breeding lines, resistant and susceptible ones, were field-planted at the onset of the growing season in summer 1994 to corroborate insect non-preference using the application of insecticide and non-insecticide field plot technique. Preliminary data indicated that selection at the seedling stage under controlled conditions for non-preference was possible since the resistant breeding lines apparently showed higher performance under field conditions.

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