

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Publications from USDA-ARS / UNL Faculty

U.S. Department of Agriculture: Agricultural
Research Service, Lincoln, Nebraska

3-2017

FEEDING PREFERENCE OF *Spodoptera frugiperda* (SMITH) (LEPIDOPTERA: NOCTUIDAE) ON *Phaseolus vulgaris* L. GENOTYPES

C. A. Freitas

Universidade Estadual Paulista, carloscaf77@gmail.com

L. Nogueira

Universidade Estadual Paulista

M. M. Freitas

Universidade Estadual Paulista

P. H. S. Barcelos

Universidade Estadual Paulista

A. L. Boiça Júnior

Universidade Estadual Paulista

Follow this and additional works at: <https://digitalcommons.unl.edu/usdaarsfacpub>

Freitas, C. A.; Nogueira, L.; Freitas, M. M.; Barcelos, P. H. S.; and Boiça Júnior, A. L., "FEEDING PREFERENCE OF *Spodoptera frugiperda* (SMITH) (LEPIDOPTERA: NOCTUIDAE) ON *Phaseolus vulgaris* L. GENOTYPES" (2017). *Publications from USDA-ARS / UNL Faculty*. 1749.
<https://digitalcommons.unl.edu/usdaarsfacpub/1749>

This Article is brought to you for free and open access by the U.S. Department of Agriculture: Agricultural Research Service, Lincoln, Nebraska at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Publications from USDA-ARS / UNL Faculty by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

FEEDING PREFERENCE OF *Spodoptera frugiperda* (SMITH) (LEPIDOPTERA: NOCTUIDAE) ON *Phaseolus vulgaris* L. GENOTYPES

C.A. Freitas¹, L. Nogueira¹, M. M. Freitas¹, P. H. S. Barcelos¹, A. L. Boiça Júnior¹

¹Universidade Estadual Paulista, Faculdade de Ciências Agrárias e Veterinárias (UNESP/FCAV), Departamento de Fitossanidade, Laboratório de Resistência de Plantas à Insetos, Via de Acesso Prof. Paulo Donato Castellane s/nº, CEP 14884-900, Jaboticabal, SP, Brazil E-mail: carloscaf77@gmail.com

INTRODUCTION

The species *Spodoptera frugiperda* (Smith, 1797) (Lepidoptera: Noctuidae) is a widely distributed pest in the American continent and with a polyphagous habit, causing damage to several crops of economic importance, such as bean bean (CASMUZ et al., 2010). The most control measure to manage *S. frugiperda* is based on sprayings of chemical insecticides. However, alternative methods less damaging to the environment have been proposed. The host plant resistance is one of them, through plants that present in their constitution genes that are capable of producing substances that interfere in the behavior and/or development of the insect (BOIÇA JÚNIOR et al., 2015). The ability of these plants to tolerate damage caused by insect pests has been aided in breeding programs to obtain genotypes with resistance characteristics. Thus, the aim of this study was to evaluate *S. frugiperda* larval feeding preference in common bean genotypes.

MATERIAL AND METHODS

The following genotypes were evaluated for resistance to *S. frugiperda* larvae: BRS Pérola, IAC Harmonia, BRS Supremo, BRS Talismã and IPR Campos Gerais. Double and multiple choice tests were performed under a randomized complete block design, with 10 replications each. In the multiple-choice test, arenas composed of 14-cm-diameter Petri dishes were used. In the double choice test, 8-cm-diameter Petri dishes were used, confronting the genotypes two by two. Petri dishes were coated to the bottom with moistened filter paper, and 3-cm-diameter leaf disc of the respective genotype was distributed equidistantly. In both tests, third-instar larvae of *S. frugiperda* was released per genotype.

The evaluation consisted in counting the average number of larvae present in the leaf discs, after, one, six and 12 hours from the beginning of the experiment. In the double-choice test, the Preference Index (PI) was calculated according to Kogan (1972), using the formula: $PI = 2A / (A + T)$, where A = number of *S. frugiperda* present in the first bean genotype confronted, and T = of the second genotype. The value of the Standard Error of the mean (SE) was added / subtracted to the values of PIs. Values of $PI \pm SE > 1$ indicate preference for genotype "A", $PI \pm SE < 1$ preference for "T" genotype and $PI \pm SE = 1$ neutrality. The PI, in the multiple-choice test was calculated taking into account the BRS Pérola genotype, as a susceptibility standard (SOUZA et al., 2012). At the end of the experiment, two evaluators determined the injury percentage caused by the larvae of *S. frugiperda* in the leaf discs, ranging from zero for uninjured pods to 100% for completely injured.

Percentage of injury data were submitted to homoscedasticity and normality analyzes. Subsequently, the data for the double-chance tests were submitted to the t-test ($p < 0.05$) while the results of the multiple-chance test were submitted to analysis of variance and then to the Tukey test ($p < 0.05$).

RESULTS AND DISCUSSION

The genotypes BRS Talismã and IPR Campos Gerais were classified as stimulants, while IAC Harmonia and BRS Supremo were considered as deterrents in the multiple-choice test (Fig. 1A). Although stimulating, the injury percentage in the genotype IPR Campos Gerais did not differ significantly from the genotypes IAC Harmonia and BRS Supremo, which presented lower injury percentages (Fig. 1B). On the other hand, BRS Talismã showed higher injury percentage.

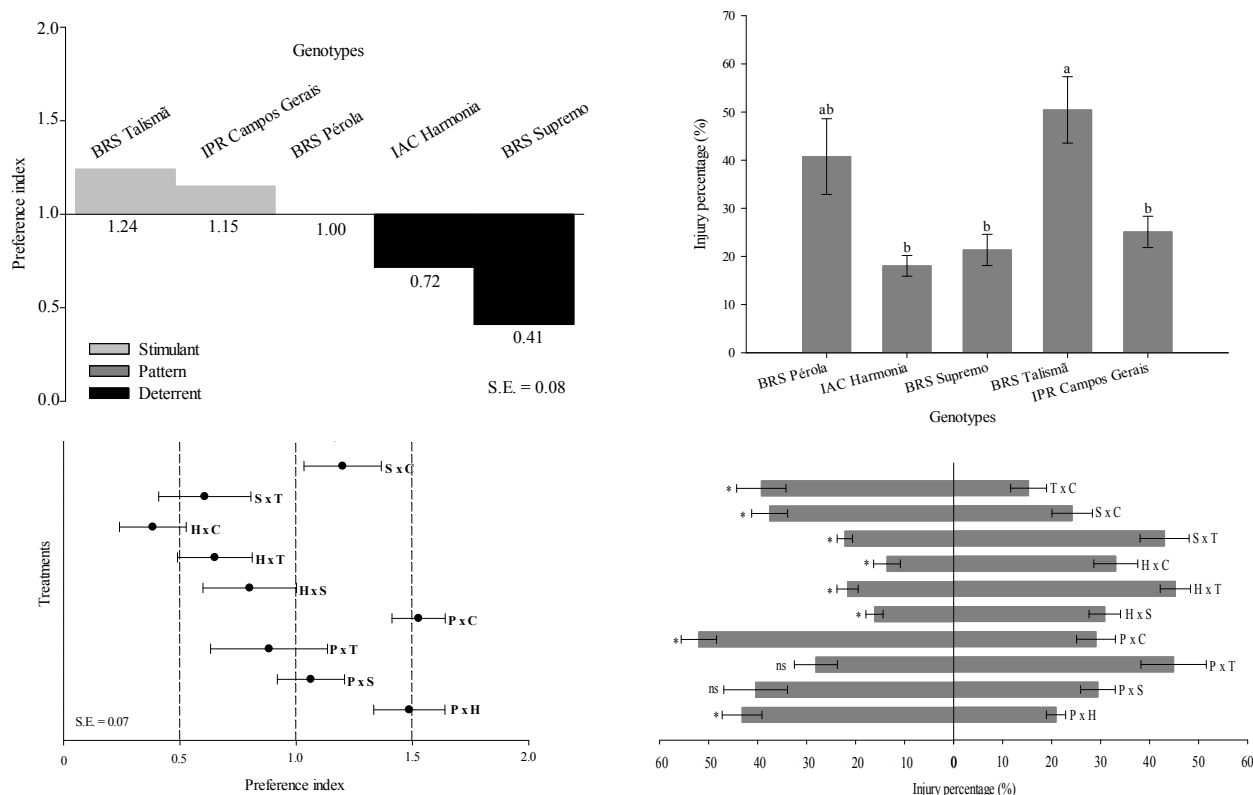


Figure 1. Preference index for feeding in multiple choice (A) and double chance (B) tests and injury percentage in tests with multiple chance (C) and double chance (D) on bean genotypes to *Spodoptera frugiperda* caterpillar. Means followed by the same lowercase letter not differ significantly by the Tukey test ($P < 0.05$); * Significant and ^{ns} not significant by t-test ($p < 0.05$). P = BRS Pérola; H = IAC Harmonia; S = Supremo BRS; T = BRS Talismã; C = IPR Campos Gerais. Jaboticabal, UNESP, 2017.

In the double-choice test, IAC Harmonia was classified as deterrent when compared to all genotypes (Fig. 1C), also reflecting lower injury percentages (Fig. 1D). BRS Talismã presented higher injury percentages when compared to the other genotypes. Overall, we conclude that the IAC Harmonia genotype presents resistance in the feeding preference category to *S. frugiperda* larvae, while BRS Talismã showed susceptibility.

REFERENCES

- BOIÇA JÚNIOR, A. L. et al. A defesa das plantas ao ataque dos insetos. In: BUSOLI, A. C. et al. (Eds.). *Tópicos em entomologia agrícola – VIII*. Jaboticabal: Maria de Lourdes Brandel-ME. 2015. p. 161-179.
- CASMUZ, A. et al. Revisión de los hospederos del gusano cogollero del maíz, *Spodoptera frugiperda* (Lepidoptera: Noctuidae). *Revista de la Sociedad Entomológica Argentina*, Mendoza, v. 69, n. 3-4, p. 209-231. 2010.
- KOGAN, M. Feeding and nutrition of insects associated with soybeans. 2. Soybean resistance and host preferences of Mexican bean beetle, *Epilachna varivestis*. *Annals of Entomological Society of America*, College Park, v. 65, p. 675-683, 1972.
- SOUZA, B. H. S. et al. Non-preference for feeding of *Spodoptera frugiperda* (Smith) (Lepidoptera) in bean genotypes. *Bean Improvement Cooperative*, v. 55, p. 211-212, 2012.