EARS RESISTANCE TO PINK STEM BORER IN MAIZE INBRED LINES

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The main pest of maize (Zea mays L.) in Europe and North America is the European corn borer (Ostrinia nubilalis Hbn.). However, another stem borer, the pink stem borer (Sesamia nonagrioides Lef.) is also a limiting factor for yield in southern Europe. Several studies have been carried out to evaluate resistance to pink stem borer but there are not studies about the ear resistance. The search for ear resistance is interesting because Sesamia nonagrioides can produce direct grain injury by feeding of larvae into the ear. The objectives of this study were: i) to estimate the distribution of larvae of Sesamia nonagrioides and Ostrinia nubilalis into the plant (stem and ear). ii) To measure the ear damage made for these corn borers under natural infestation conditions and iii) to evaluate the ear resistance to pink stem borer in the inbred collection maintained at the Misión Biológica de Galicia (Pontevedra, Spain) under artificial infestation conditions.

To know the distribution of larvae borers into the plant inbred lines of maize were grown in 1991, 1992 (early and late sowing) and 1993 at Pontevedra (Northwestern Spain). In each environment several samples were taken at different dates to evaluate the natural infestation level and ear damage at different stages of crop development. At least 200 plants were dissected at each sampling date. The number of larvae of Sesamia nonagrioides and Ostrinia nubilalis per ear and per stem, and the number of damaged ears were recorded.

To evaluated the ear resistance to pink stem borer 134 inbred lines were grown in 1993 and 1994 under artificial infestation conditions using eggs of Sesamia nonagrioides. At harvest, the damage produced in the ears by the borer was estimated in all the infested plants.

Generally, the number of larvae of Sesamia was bigger than the number of larvae of Ostrinia in the stems and in the ears. In the majority of cases the number of individuals of Sesamia per stem was significantly different from the number of individuals of Sesamia per ear, at each sampling date. However, the number of larvae of Sesamia per ear was considerable. The percentage of attacked ears varied from 4.03 to 82.65%. Therefore, although Sesamia nonagrioides preferred for feeding the stem than the ear, the percentage of damaged ears under natural infestation conditions was sufficient to justify the search of ear resistance.

'A635' had the least percentage of ears with damaged cob, the best general appearance of ear and a high percentage of ears without damage. The line 'G' showed a good general appearance and the highest percentage of ears without damage. 'A632' exhibited few damaged ear though it had a big number of larvae of Sesamia per ear, it could be tolerant to the pest. 'A509' and 'EP4' did not have any larvae of Sesamia per ear; therefore, these inbreds could possess a resistant mechanism of antibiotic type. Moreover, 'EP4' showed low damaged grain.

'B14A' showed a good general appearance and a high percentage of ears without injury. 'A635', 'G' 'B14A', 'EP32', 'EA2000', 'A239', 'A632', 'A166', 'A251', 'A509', 'EA2024', 'EP55' and 'Mo20W' were the best inbreds against the pest.

In conclusion Sesamia nonagrioides was more abundant than Ostrinia nubilalis in the Northwest of Spain. The larvae of Sesamia live into the stem although they can attack the ear producing important injury. Some inbred lines showed ear resistance to Sesamia nonagrioides and they could be used in future breeding programs to obtain ear resistant varieties.