

## **Transference of sorghum midge resistance in to agronomically acceptable lines**

R.G. Henzell, R.L. Brengman and F.D. Page

Queensland Department of Primary Industries.

Sorghum midge, *Contarina sorghicola* Coquillett, is an important pest of grain sorghum in Australia. Damage by the midge occurs through larvae feeding upon the developing seed which results in the destruction of the seed. The only effective method of control at the present is the repeated application of insecticides during flowering.

Johnson et al. (1973) reported the discovery of resistance to midge among lines converted from tropical to temperate, mechanically harvestable types. The sorghum breeding program of the Qld. D.P.I. in 1975 undertook to transfer the reported resistances into lines usable in producing commercial hybrids. Page (1979) developed a cage screening technique which can accurately assess small numbers of lines, but a technique with less labour requirement was needed for the preliminary screening of large numbers of lines produced by the breeding program.

Accurate screening of the levels of resistance contained in large numbers of lines is vital in the breeding of midge resistance. After eight trials over three years a field screening method has been evolved which is reasonably simple and accurate. The screening method is as follows: before the planned planting of the screening trial, two midge build-up plantings are made, one at six weeks and the other at three weeks. A mixture of sorghums are used for the above midge build-up planting to prolong the flowering period. The sorghum for midge build-up is planted in long single or paired rows through the screening trial area at twelve metre spacings between rows. The screening trial is then planted on the selected date between the previously planted build-up rows. Within the screening trial a susceptible check is systematically interspersed at a frequency of 1 : 10.

At flowering the screening trial is marked every other day by spraying paint on the peduncle of every head mid-way through anthesis. At maturity the percent seed set of the susceptible checks are examined to define periods during which midge numbers were high and evenly distributed over the trial area. The screening trial is then rated for percent seed set during this period.

Screening trials are conducted at three separate locations in each year and lines are selected on the basis of consistency of high seed set. In the Qld. D.P.I. program an original 9000 F3 lines has been reduced to 230 F6 lines with levels of resistance approaching that of the resistant sources. These resistant lines have been further reduced to 81 by preliminary screening for other agronomically valuable traits. Final selections will also be tested in the more rigorous cage screening tests described by Page (1979).

Johnson, R.W., Rosenow, D.T., and Teetes, G.L. (1973). *Crop Sci.* 13: 754.

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