SHORT COMMUNICATION

Yield losses due to proliferation in DHM 103, a maize hybrid

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Maize (*Zea mays* L.) is one of the important food, fodder and industrial crops of Andhra Pradesh. It is grown in an average of 3.17 lakh hectares with an annual production of 5.11 lakh tonnes ranking fifth in area, fourth in production and third in productivity (AICMIP, 1988). The crop is grown round the year near cities and large towns, but in general it is mostly grown as rainfed crop. The newly developed high yielding hybrids are, however, more profitable to grow (Singh, 1986), but for stablizing production it is necessary to build an adequate level of genetic resistance against diseases of major economic importance (Singh, 1983 ; Ullstrup, 1966) in addition improving efficient distribution of dry matter into the economic Sink (Grain development). In fact, the major break through in cereal grain yield has been due to almost entirely to the improvement of source to silk relationship without an increase in total dry matter production (Singh and Stoskopf, 1971 ; Donald and Hamblin, 1976). Harvest index which is a measure of efficiency of dry matter pertitioning to the grain is considered as one of the most important aspect of plant type concept in maize and other cereals (Donald and Hamblin, 1976 ; Mock and Pearce, 1975). It was suggested that the selection of parents is in breeding programme should be extended to include materials of high harvest index, even involving genotypes of lower biological yield and grain yield (Donald and Hamblin, 1976). The photosynthate distribution from specific leaf position proceeds in a non-random fashion after pollination (Eastin, 1969). Leaf position relative to the ear markedly influences the rate and direction of photosynthate translocation (Tripathy, 1968). Keeping in view of these facts it was also suggested that the lines with proliferation which result in shorter and cluster of ears, fewer grain rows per ear, fewer grains per row and a lower grain weight or even complete sterile or barren ears were also to be avoided in the breeding programme.

There were many complaints of barrenness, sterility, proliferation, stunting, death of plants and also incidence of different diseases in maize growing areas of Adilabad and Nizamabad districts of Andhra Pradesh State during 1985 and 1986. In this connection a detailed studies were conducted by touring the maize growing areas of Andhra Pradesh. In the present investigation yield losses due to proliferation in DHM 103, a maize hybrid, and its varying intensity in different villages that were recorded in two districts are reported.

During *rabi* 1985 an extensive survey was made in maize growing areas of the district of Adilabad covering different villages namely Kadthal, Ganjal, Gundapalli, Narsapur, Kondapur, Venkatapur and Akkapur were visited. Similarly during *kharif* 1986 tour was undertaken in different taluqas of Nizamabad district covering villages namely Ditchpalli ; Nadupalli, Suddapalli, Bheemgal, Phatepur and Kisan nagar. In both these districts majority of the area was covered by DHM 103 a maize double cross hybrid. In each village four to five different maize plots were visited and had discussions with the respective farmers. At the time of inspection of individual plots 4 to 5 random samples, each sample consisting of 100 individual plants were taken into consideration for estimating the per cent of proliferation. The data on proliferation in different villages of two districts along with its respective yield losses are presented in Table 1.

Table 1. Yield losses due to proliferation in DHM 103

Sl. No.	District/village	Year	Range of per cent of proliferation	No. of samples collected	Reported average yield losses (%)
1	Adilabad (District)	Rabi 1985			
	(a) Kadthal	,,	9-18	5	16
	(b) Ganjal	,,	8-16	5	12
	(c) Gundapalli	,,	15-21	5	18
	(d) Narsapur	,,	7-12	5	8
	(e) Kondapur	,,	6-11	4	7
	(f) Venkatapur	,,	5-15	5	11
	(g) Akkapur	,,	10-18	5	14
2	Nizamabad	Kharif 1986			
	(a) Ditchapalli	,,	7-14	5	11
	(b) Nadupalli	,,	5-8	5	5
	(c) Suddapalli	,,	14-20	5	16
	(d) Bheemgal	,,	15-22	5	20
	(e) Phatepur	,,	10-20	5	16
	(f) Kisannagar	,,	20-22	5	22

It was observed from the data and also discussions with the farmers of different villages, that the yield losses had ranged from 5 to 22 per cent in DHM 103 which was attributed to the respective degree of proliferation because proliferation resulted completely sterile ears in clusters from a single axil on the maize stalk.

In general, the proliferation of a hybrid is proportional to the number of inbreds possessing that character. The degree of proliferation of the parental inbreds and its genetic constitution influences the degree of its expression in the hybrid. In case of DHM 103 a double cross hybrid had four inbreds as its parents, out of which one parent namely CM 118 had this character. Hence the degree of its expression in the hybrid was limited to below 25 per cent. The varying degree of proliferation at different locations indicated the presence of interaction between four genotypes involved in the hybrid or with the environment.

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(Received for publication 3 November 1989)