

## A HIGH YIELDING AND DOWNY MILDEW RESISTANT HYBRID MAIZE

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### ABSTRACT

A downy mildew resistant, high yielding maize hybrid CoH2 has been released for general cultivation in Tamil Nadu. The hybrid has a duration of 95-100 days and 10-15 days earlier than Ganga.5 and Co.1. Under irrigated conditions, the hybrid yields 5472 kg of grain per hectare which is 41.9 and 66.6 per cent more yield than Ganga.5 and CoH1 respectively. The plant height of the hybrid is 225-260 cm. The cobs are fully covered with husk. The grains are bold, yellow in colour and flinty in texture and are acceptable to consumers. The downy mildew incidence in CoH2 was lower (1.1 per cent) while it was 2.9 and 28.3 per cent in CoH1 and Ganga.5 respectively.

Maize (*Zea mays* (L)) is an important commercial crop grown in Tamil Nadu in an area of 50000 ha with an annual production of 59800 tonnes. Maize is cultivated in all the three seasons, viz., Jan- Feb., June-July and Oct-Nov. The incidence of downy mildew disease is the major problem in maize.

Almost all the varieties released by Co-ordinated Programme are susceptible to downy mildew disease in this State Hence, systematic breeding work to develop downy mildew resistant maize composite/hybrid was undertaken. As a result, a maize hybrid CoH1 was released during 1981 and one composite Co 1 was released for general cultivation during 1985. To develop a composite/hybrid with higher grain yield superior to the ruling varieties/hybrids was attempted.

### MATERIALS AND METHODS

Germplasm collections were screened in the artificially created downy mildew sick plot. The downy mildew resistant inbreds were crossed to obtain single cross hybrids. These hybrids were evaluated for their yield and downy mildew

resistance over years. one hybrid UMH.9 was identified to have potentiality for high yield and disease resistance. It was found to have high adaptability for cultivation both under rainfed and irrigations conditions. This hybrid was tested under Multilocation trails and adaptive research trails and in addition to coordinated trails.

### RESULTS AND DISCUSSION

The performance of UMH.9 (CoH2) hybrid in station trails is presented in Table-1. This hybrid was tested in Coimbatore from *Kharif* 1981 to 1987 and the mean grain yield over seasons was 5472 kg/ha as against 3856 and 3284 kg/ha recorded by Ganga.5 and CoH1 respectively.

In All India Coordinated Maize Improvement project trials conducted during *kharif* '94, CoH2 (UMH.9) recorded 4803 kg/ha which is 25.5 per cent increase over Vijay. In multilocation trials (MLT) conducted at the research stations, this hybrid recorded 43.9 per cent and 62.8 per

Table 1. Performance of UMH.9 in Station Trials - Coimbatore

Season	UMH.9	Ganga.5	CoH.1
Kharif '81	5899	5138	-
Kharif '82	4833	3644	3437
Kharif '83	5741	4908	-
Kharif '84	3895	3313	2954
Kharif '85	5995	3151	3248
Kharif '86	5958	3357	3587
Kharif '87	5984	3484	3192
Mean	5472	3856	3284
% increase		41.9	66.6

Table 2. Performance of UMH.9 in MLT Trials

	Mean grain yield Kg/ha		
	UMH.9	CoH.1	Co.1
Coimbatore	3843	3031	2330
Pudukkottai	1060	840	700
Bhavanisagar	1318	1073	1220
Aruppukkottai (1986)	937	719	727
Aruppukkottai (1987)	1876	610	607
Mean	1807	1255	1110
% increase		43.9	62.8
Reaction to Downy Mildew Disease (% of incidence)			
	UMH.9	CoH 1	Ganga.5
Mean of 8 years	1.1	2.9	28.3

**APPENDIX - I**  
**Distinguishing characters of parental inbreds of CoH2 Hybrid Maize.**

Characters	UMI.810	UMI.90
Colour and number of internodes	Green 12-16	Green 10-11
Colour of brace root and its development	Pink with greenish yellow tinge	Pink with greenish yellow tinge
Stem colour	Green	Green
Leaf size and texture	Pubescent, broad leaves with white midrib	85-90 cm length, 7.5-8.5 cm width, pubescent leaves
Silk colour	Yellowish green, turns pink	Yellowish green turns pink
Tassel colour and type	Yellowish green turns pink	Yellowish green turns pink with 15-20 branches in tassel
Cob colour and shape	Cylindrical with deep orange flint grains	Cylindrical with yellow grains
Grain colour and texture	Deep orange, flint grains	Yellow flint
Special feature	Resistant to downy mildew	Slightly susceptible to downy mildew

cent increased yield over the checks CoH1 and Co 1 respectively (Table. 2)

The incidence of downy mildew disease under sick plot conditions were recorded for 8 years and mean incidence of CoH2 (UMH.9) was 1.1 per cent as against 2.9 and 28.3 per cent in CoH1 and Ganga.5 respectively (Table.2). In ART, this hybrid recorded 3432 kg/ha in 45 trials which is 11.4 per

cent increase over CoH1 and 6.2 per cent over Ganga.5.

In view of the high yield, disease resistance and grain quality, this hybrid was released as CoH2 for general cultivation in Tamil Nadu.

The description of the parental varieties are given in Appendix.1.

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## X6 - A NEW PEARL MILLET HYBRID FOR TAMIL NADU

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### ABSTRACT

With a view to develop a downy mildew resistant high yielding hybrid in pearl millet, number of crosses were effected between the stable downy mildew resistant male sterile line (PT 732A) and different inbreds. A combination, UCH 11 (PT 732A x PT 3095) was identified and released as hybrid X6 for general cultivation in Tamil Nadu in view of its high yield potential and resistance to downy mildew disease. The features of the hybrid are described in this paper.

Tamil Nadu occupies seventh position both in area and production of pearl millet (*Pennisetum glaucum* (L.)R.Br.) in the country with an estimated area of 2.98 lakh ha and production of 2.81 lakh tonnes annually. The discovery of cytoplasmic genic male sterility and the development of male sterile line Tift 23A(A1 source) by Burton (1958) was the basis for hybrid seed production in this crop. Two other sources of male sterility were subsequently identified in India (Athwal, 1965) viz., L 66A(A2 source) and L67A (A3 source).

The major problem encountered with the pearl millet hybrids is their susceptibility to downy mildew. This poses a bottleneck for increasing the yield and productivity in this crop. Intensive efforts to diversify the male sterile sources at Tamil Nadu Agricultural University resulted in the development of a new stable, dwarf and highly tillering male sterile line PT 732A (Appadurai *et al.*, 1982) with a different cytoplasmic background and resistant to downy mildew. An attempt was made to develop a high yielding downy mildew resistant hybrid using this male sterile line with proven restorers and the results are reported.