Madras Agric. J. 89 (7-9) : 487-490 July-September 2002

https://doi.org/10.29321/MAJ.10.A00255

COCu H 8: A high yielding downy mildew resistant pearl millet hybrid

N. SUBBARAMAN, N. JAYARAMAN, P. GOMATHINAYAGAM, G. NALLATHAMBI, C. SURENDRAN, P. VEERABADHIRAN, B. MEENAKUMARI AND SANGEETHA PANICKER
Dept. of Millets, Centre for Plant Breeding and Genetics, Tamil Nadu Agrl. Univ., Coimbatore-641 003.

Abstract : The pearl millet hybrid TNBH 5635 is a cross between 732 A and PT 4550, was developed at the Department of Millets, Centre for Plant Breeding and Genetics, TNAU, Coimbatore. This new hybrid recorded a mean grain yield of 2841 kg ha^{-1} under rainfed condition and 3682 kg ha^{-1} under irrigated conditions. This hybrid exhibited resistance to downy mildew disease. It has acceptable cooking quality. Hence the culture TNBH 5635 was released as COCu H 8 pearl millet hybrid for commercial cultivation in Tamil Nadu.

Keywords : Pearl Millet, Hybrid, Downy mildew, Resistance.

Introduction

In India, pearl millet (*Pennisetum glaucum* (L). R.Br. is cultivated over an area of 100 lakh ha with an annual production of 79 L.Mt. The average productivity is 791 kg ha^{-1} in India. In Tamil Nadu it is cultivated in an area of 1.65 lakh ha with an annual production of 1.95 L.Mt. The productivity in Tamil Nadu is 1184 kg ha^{-1}. The grain yield of cumbu gets reduced due to downy mildew disease. Hence a high yielding hybrid COCu H 8, resistant to downy mildew was developed at the Millet Breeding Station, Coimbatore by use of three line breeding exploiting the hybrid vigour through the use of cytoplasmic genic male sterility system.

Materials and Methods

The pearl millet hybrid TNBH 5635 was developed with 732 A as female parent and PT 4450 as the male parent. Initially the hybrid TNBH 5635 was tested for yield performance from *kharif* 1993 to 2000 in station trails. It was extensively tested in multilocation trials, adaptive research trials and in All India Co-ordinated trials also.

Results and Discussion

In the statioin trails conducted at Millet Breeding Station, TNAU, Coimbatore, from 1993-2000, the culture TNBH 5635, recorded a mean grain yield of 3994 kg ha^{-1} while the checks

Table 1. Performance of TNBH 5635 at Millet Breeding Station, Coimbatore.

Year	Grain yield (kg ha^{-1})							
	Kharif				Summer			
	TNBH 5635	X7	Co 7	WCC 75	TNBH 5635	X 7	Co 7	WCC 75
1993	3925	3145	2675	2418	4728	3925	3324	3060
1994	4210	3409	2898	2649	5796	4794	3982	3532
1995	3875	3115	2648	2395	4240	3520	3128	2848
1996	3910	3020	2560	2321	4510	3952	3225	2772
1997	3710	3005	2355	2121	4748	4200	3420	2831
1998	3815	3120	2510	2252	5210	4118	3223	2688
1999	4527	3627	3167	2911	4910	4408	3619	3250
2000	3983	3259	2859	2603	4847	4247	3488	2905
Mean	3994	3212	2709	2459	4874	4145	3427	2986
% on X 7	124.3	100.0	84.3	76.5	117.6	100.0	82.7	72.0
% on CO 7	147.4	118.6	100.0	98.8	142.2	120.9	100.0	87.1
% on WCC 75	162.4	130.6	110.1	100.0	163.2	138.8	114.8	100.0

Table 2. Performance of TNBH 5635 in ART in different season/year

Year / Season	No.of locations	Grain yield (kg ha^{-1})			
		TNBH 5635	X 7	Co 7	WCC 75
Kharif 97	41	1751	1609	1658	1649
Kharif 98	50	1926	1767	1787	1739
Kharif 99	36	1855	1687	1599	1709
Mean	127	1844	1688	1681	1698
% on X 7		109.2	100.0	99.6	100.6
% on CO 7		109.6	100.4	100.0	101.0
% on WCC 75		108.6	99.4	99.0	100.0
Rabi 97	35	1810	1643	1628	1629
Rabi 98	32	1742	1758	1750	1810
Rabi 99	34	1801	1827	1753	1715
Mean	101	1784	1743	1710	1718
% on X7		102.3	100.0	98.1	98.6
% on CO 7		104.3	101.9	100.0	100.5
% on WCC 75		103.8	101.5	99.5	100.0
Summer *97*	34	2625	2280	2641	2296
Summer *98*	28	2379	2124	2048	2083
Summer *99*	32	2469	2370	2245	2226
Mean	94	2491	2258	2311	2201
% on X7		110.3	100.0	102.3	97.5
% on Co 7		107.8	97.7	100.0	95.2
% on WCC 75		113.2	107.6	105.0	100.0
Over all mean	322	2040	1896	1901	1872
% on X 7		107.6	100.0	100.3	98.7
% on CO 7		107.3	99.7	100.0	98.5
% on WCC 75		109.0	101.3	101.5	100.0

X7, CO 7 and WCC 75 recorded a mean grain yield of 3212 kg ha^{-1}, 2709 kg ha^{-1} and 2459 respectively in the *kharif*, season. During summer, the hybrid TNBH 5635 recorded a mean grain yield of 4874 kg ha^{-1} which was 17.6, 42.2 and 63.2 per cent increase over the checks X7, CO 7 and WCC 75 respectively (Table 1).

The yield performance of TNBH 5635 in ART in different seasons/years is given in Table 2. A total of 322 Adaptive Research Trials were conducted spread over three years *viz.* 1997, 1998 and 1999 in *kharif, rabi*, and summer seasons. On an average, the hybrid TNBH 5635 had recorded higher yields than the checks during *kharif, rabi* and summer seasons in all the three years the yield advantage over the check WCC 75 was upto 9.0 per cent.

In the All India Trials (1998-99) carried out in different states, the hybrid TNBH 5635 recorded a mean grain yield of 3010 kg ha^{-1} against the check ICMH 356 which recorded only 2466 kg ha^{-1} (Table 3).

With regard to disease reaction, under field condition there was no incidence of downy mildew, rust or ergot disease in the hybrid TNBH 5635 (Table 5).

Table 3. Mean performance of TNBH 5635 in All India trials (1998-99)

Locatioins (state)	Grain yield (kg ha^{-1})	
	TNBH 5635	ICMH 356
Rahuri (MH)	1106	993
Aurangabad (MH)	2369	1950
Aurangabad (MH)	3588	2778
Dhule (MH)	4105	2022
Jalna (MH)	2720	1498
Buldana (MH)	1348	1631
Mahuwa (GU)	3076	2111
Bijapur (KA)	2537	2523
Hydrabad (AP)	2176	2185
Medchal (AP)	5657	5699
Anarapura (AP)	2639	2204
Secundrabad (AP)	2583	1447
Coimbatore (TN)	5287	5019
Mean (13)	3014	2466
% on ICMH 356 (Ch)	122.2	100.0

Table 4. Overall mean performance of TNBH 5635

Sl.No. Trial	Grain yield (kg ha^{-1})			
	TNBH 5635	X 7	CO 7	WCC 75
Kharif				
Research station trials (8)	3994	3212	2709	2459
Multilocation trials (7)	2511	1877	1754	1722
All India trials (13)	3014	-	-	-
Adaptive research trials (127)	1844	1688	1681	1698
Mean (155)	2841	2259	2048	1960
% on X 7	125.8	100.0	90.6	86.8
% on CO 7	138.7	110.3	100.0	95.7
% on WCC 75	144.9	115.2	104.5	100.0
Summer				
Research station trials (8)	4874	4145	3427	2986
Adaptive research trials (94)	2491	2258	2311	2201
Mean (102)	3682	3201	2869	2593
% on X 7	115.0	100.0	89.6	81.0
% on CO 7	128.3	111.6	100.0	90.4
% on WCC 75	142.0	123.4	110.6	100.0

Table 5. Disease reaction of TNBH 5635 under field conditions

Entry	Downy mildew (%)	Rust (%)	Ergot (%)
TNBH 5635	0.0	0.0	0.0
X 7	0.0	0.0	0.0
CO 7	0.0	0.0	0.0
WCC 75	5.0	0.0	0.0
HB 3	25.0	0.0	0.0

Table 6. Quality characters of TNBH 5635

Sl.No.	Variety	Protein %	Endosperm (%)	Husk (%)
1.	TNBH 5635	13.8	90.5	9.5
2.	X 7	13.8	90.0	10.0
3.	CO 7	12.9	91.5	8.5
4.	WCC 75	10.3	89.1	10.9

Besides higher grain yield and resistance to downy mildew, the protein per cent was also more (13.85) in TNBH 5635 than CO 7 (12.6% and WCC 75 (10.3%) (Table 6). Because of its superiority, the hybrid TNBH 5635 was released COCu H 8 for commercial cultivation in Tamil Nadu.

It matures in 80-85 days. The height of the plant is 140 to 170 cm with spindle shaped earheads. The grain is amber coloured and medium in size. The 1000 grain weight is 8.5 to 9.5 g. The average grain yield is 2841 kg ha^{-1} under rainfed and 3682 kg ha^{-1} under irrigated conditions (Table 4). The protein content is 13.8 per cent.

(Received : July 2002 ; Revised : March 2002)