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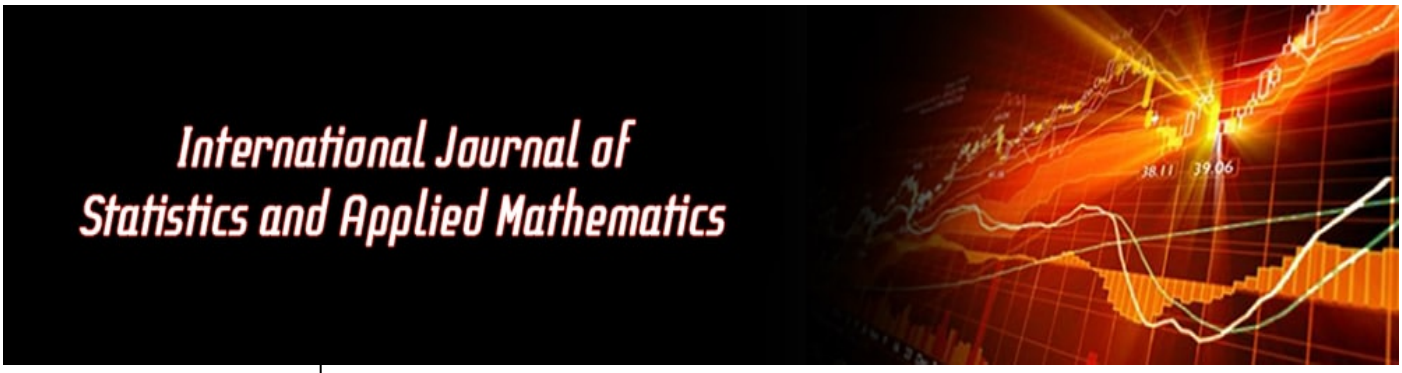

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Assessment of yield and it's contributing traits in maize population

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Abstract
The present study was carried out at Department of Millets, Centre for Plant Breeding and Genetics, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India to identify the best performing Sorghum Downy Mildew resistant progeny for agronomical traits. The objective of this study was to assess the better *per se* performance of the resistant progeny for yield and its contributing traits. Twelve biometrical traits of five SDM resistant progenies *viz*., UMI 79/936-C1-3, UMI 79/936-C1-7, UMI 79/936-C1-29, UMI 79/936-C1-67 and UMI 79/936-C1-101 were used for this purpose. Analysis revealed that among the five progenies studied, four progenies *viz*., UMI 79/936-C1-7, UMI 79/936-C1-67, UMI 79/936-C1-67 and UMI 79/936-C1-101 showed better *per se* performance for yield and its contributing traits. These four progenies showed highest mean values. It exhibited more mean values than the parents for the characters *viz*., Cob length, Cob diameter, No. of rows per cob, No. of. Kernels per row, Cob weight, Yield per plant, 100 grain weight. Based on the present assessment, identified four progenies possess the resistance to disease along with better *per se* performance for yield and its contributing traits.

Keywords: Bio metrical observation, sorghum downy mildew resistant and maize

Introduction
Maize (*Zea mays* L.) is world's third most important crop after rice and wheat. It is a versatile crop, growing across a range of agro ecological zones. The importance of maize to sustainable development cannot be overstated. Maize is utilized as food for human consumption, as feed for livestock and as a raw material for industry (FAO, 1992) [3]. Plant breeders are interested in developing cultivars resistant to pest and disease with improved yield and other phenological characters. In order to achieve this goal, the breeders had the option of selecting desirable genotype in early generations or delaying intense selection until advanced generations. Downy mildews are important maize diseases in many tropical regions of the world. They are particularly destructive in many regions of tropical Asia where losses in excess of 70% have been documented.
Globally, downy mildew affected areas with significant economic losses are reported to be as high as 30% (Jeffers *et al*., 2000) [4]. Moreover, due to the economic cost of the chemicals and the emergence of chemical resistance in the downy mildew pathogens (Raymundo, 2000) [8], the use of host plant resistance seems to be the most effective, economical and it is meant as a safer way of controlling SDM in maize (Rathore and Jain, 2000) [5]. The genetic information relating to host resistance is vital for making breeding decisions.
Mean is the primary criterion for selection in any breeding programme. Mean serves as a basis for eliminating undesirable crosses or progenies. Hence, the present assessment were undertaken to identify the best performing SDM resistant progeny for yield contributing characters through mean performance.

Materials and Methods
The experiment was carried out at Department of Millets, Centre for Plant Breeding and Genetics, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India during Rabi 2012. BC_2F_1 population has been used for this study. It is derived from crossing the inbred UMI 79 which is susceptible for sorghum downy mildew and UMI 936 (w) which has resistance for sorghum downy mildew and backcrossing with UMI79.

Five BC_2F_1 progenies *viz*., *viz*., UMI 79/936-C1-3, UMI 79/936-C1-7, UMI 79/936-C1-29, UMI 79/936-C1-67 and UMI 79/936-C1-101 were found as resistant to sorghum downy mildew and these progenies were taken for analysis their yield and it's contributing traits.

In these five progenies, the data on twelve Biometric traits *viz*., days to 50% tasseling, days to 50% silking, plant height, Ear height, Cob length, Cob diameter, Number of rows per cob, Number of kernels per row, Cob weight, Yield per plant, 100 grain weight and shelling percentage were recorded. Mean performance were calculated using the descriptive statistical analysis. Mean performance were carried out for five progenies. Range was worked out for different biometrical traits from the minimum and maximum value of the trait. The data on the mean *per se* performance and Range values for Five BC_2F1Progenies of Maize are furnished from Table 1to Table 5.

Table 1: Mean Performance in UMI 79/936-C1-3 of BC_2F_1 Progenies

S. No	Traits	Grand Mean			Range	
		P1	P2	BC_2F_1	Min.	Max.
1	Days to 50 per cent tasseling	55.40	63.40	56.00	54.00	58.00
2	Days to 50 per cent silking	56.40	65.40	58.60	56.00	61.00
3	Plant height (cm)	85.40	104.80	101.60	78.00	124.00
4	Ear height (cm)	43.60	50.40	54.00	40.00	68.00
5	Cob length	11.74	12.60	12.80	10.80	15.10
6	Cob diameter	11.28	11.44	12.30	9.90	13.40
7	No. of. rows per cob (cm)	18.80	14.80	16.80	14.00	20.00
8	No. of. kernels per row (cm)	20.80	16.60	18.60	15.00	22.00
9	Cob weight (g)	65.48	30.30	40.06	25.80	55.00
10	Yield per plant (g)	51.46	21.22	28.62	17.00	42.50
11	100 Grain weight (g)	19.46	16.92	18.44	15.70	21.20
12	Shelling %	78.54	69.53	69.52	52.31	81.57

Table 2: Mean Performance in UMI 79/936-C1-7 of BC_2F_1 Progenies

S. No	Traits	Grand Mean			Range	
		P1	P2	BC_2F_1	Min.	Max.
1	Days to 50 per cent tasseling	55.40	63.40	55.57	54.00	58.00
2	Days to 50 per cent silking	56.40	65.40	57.86	56.00	61.00
3	Plant height (cm)	85.40	104.80	116.00	78.00	124.00
4	Ear height (cm)	43.60	50.40	59.43	40.00	68.00
5	Cob length	11.74	12.60	15.04	10.80	15.10
6	Cob diameter	11.28	11.44	12.13	9.90	13.40
7	No. of. rows per cob (cm)	18.80	14.80	18.86	14.00	20.00
8	No. of. kernels per row (cm)	20.80	16.60	19.43	15.00	22.00
9	Cob weight (g)	65.48	30.30	75.97	25.80	55.00
10	Yield per plant (g)	51.46	21.22	57.69	17.00	42.50
11	100 Grain weight (g)	19.46	16.92	19.13	15.70	21.20
12	Shelling %	78.54	69.53	76.11	52.31	81.57

Table 3: Mean Performance in UMI 79/936-C1-29 of BC_2F_1 Progenies

S. No	Traits	Grand Mean			Range	
		P1	P2	BC_2F_1	Min.	Max.
1	Days to 50 per cent tasseling	55.40	63.40	57.07	55.00	59.00
2	Days to 50 per cent silking	56.40	65.40	59.25	57.00	61.00
3	Plant height (cm)	85.40	104.80	115.32	78.00	140.00
4	Ear height (cm)	43.60	50.40	60.14	40.00	86.00
5	Cob length	11.74	12.60	12.38	7.50	17.50
6	Cob diameter	11.28	11.44	10.92	7.60	14.60
7	No. of. rows per cob (cm)	18.80	14.80	19.29	12.00	22.00
8	No. of. kernels per row (cm)	20.80	16.60	19.89	15.00	26.00
9	Cob weight (g)	65.48	30.30	53.70	26.00	90.50
10	Yield per plant (g)	51.46	21.22	39.48	17.00	68.50
11	100 Grain weight (g)	19.46	16.92	17.98	12.60	25.00
12	Shelling %	78.54	69.53	72.97	55.17	81.36

Table 4: Mean Performance in UMI 79/936-C1-67 of BC_2F_1 Progenies

S. No	Traits	Grand Mean			Range	
		P1	P2	BC_2F_1	Min.	Max.
1	Days to 50 per cent tasseling	55.40	63.40	56.21	55.00	58.00
2	Days to 50 per cent silking	56.40	65.40	58.64	57.00	61.00
3	Plant height (cm)	85.40	104.80	100.43	75.00	120.00
4	Ear height (cm)	43.60	50.40	52.86	38.00	65.00
5	Cob length	11.74	12.60	12.46	8.30	15.60
6	Cob diameter	11.28	11.44	11.35	8.20	14.00
7	No. of. rows per cob (cm)	18.80	14.80	18.29	14.00	22.00
8	No. of. kernels per row (cm)	20.80	16.60	20.07	15.00	25.00
9	Cob weight (g)	65.48	30.30	56.35	35.00	83.00
10	Yield per plant (g)	51.46	21.22	45.90	22.00	65.40
11	100 Grain weight (g)	19.46	16.92	18.13	13.60	22.40
12	Shelling %	78.54	69.53	74.06	50.85	70.37

Table 5: Mean Performance in UMI 79/936-C1-101 of BC_2F_1 Progenies

S.no	Traits	Grand Mean			Range	
		P1	P2	BC_2F_1	Min.	Max.
1	Days to 50 per cent tasseling	55.40	63.40	56.00	54.00	59.00
2	Days to 50 per cent silking	56.40	65.40	58.00	56.00	61.00
3	Plant height (cm)	85.40	104.80	107.00	85.00	122.00
4	Ear height (cm)	43.60	50.40	54.38	43.00	68.00
5	Cob length	11.74	12.60	11.96	9.40	14.30
6	Cob diameter	11.28	11.44	10.61	8.20	12.20
7	No. of. rows per cob (cm)	18.80	14.80	18.77	12.00	24.00
8	No. of. kernels per row (cm)	20.80	16.60	20.23	15.00	26.00
9	Cob weight (g)	65.48	30.30	56.92	34.60	76.00
10	Yield per plant (g)	51.46	21.22	40.93	22.00	58.40
11	100 Grain weight (g)	19.46	16.92	19.12	15.60	23.40
12	Shelling %	78.54	69.53	70.75	59.27	82.06

Results and Discussion

Mean is the primary criterion for selection in any breeding programme. Mean serves as a basis for eliminating undesirable crosses or progenies. Choice of parents is one of the most essential step in any breeding programme. Selection method can extract good cultivars if the parents used in the breeding programme are suitable. Therefore, an elite inbred UMI 79 was selected to introgress SDM resistance from UMI 936(W). Inclusion of elite inbred as parent (UMI 79) will largely help to ensure the recovery of a high proportion of progenies (inbreds) with adaptation and quality that would in turn helpful in developing superior hybrids with SDM resistance. The parents selected in the study UMI 79 and UMI 936(w) was having extreme variations in case of SDM resistance parameters. F_1s' of these parents were selected for further advancement so that the recovery of the parental genotype is faster with not much compromise on local adaptability and *per se* performance of the recurrent inbred.

The important biometrical traits *viz*., days to 50 per cent tasseling, days to 50 per cent silking, days to maturity, plant height, ear height, cob length, cob diameter, number of rows per cob, number of grains per row, cob weight, shelling per cent, 100 grain weight and grain yield per plant were studied in the back crossed generations to simultaneously monitor the agronomic performance of the introgressed progenies.

Mean values for various traits were computed for resistant progenies in BC_2F_1generation. Among the five progenies, four progenies *viz*., UMI 79/936-C1-7, UMI 79/936-C1-67 UMI 79/936-C1-67 and UMI 79/936-C1-101 except progeny UMI 79/936-C1-3 showed better *per se* performance for yield and it's contributing characters almost nearer to recurrent parent. The progeny UMI 79/936-C1-7 showed highest mean

values than the recurrent parent for the characters namely cob length (15.04 cm), cob diameter (12.13 cm), number of rows per cob (18.86), number of grains per row (19.43), cob weight (75.97), 100 grain weight (19.13 g), yield per plant (57.69 g) and shelling per cent (76.11).

In the case of progeny UMI 79/936-C1- 29 also showed highest mean values for the characters namely cob length (12.38 cm), cob diameter (10.92 cm), number of rows per cob (19.29), number of grains per row (19.89), cob weight (53.70), 100 grain weight (17.98 g), yield per plant (39.48 g) and shelling per cent (72.97). In the progeny of UMI 79/936-C1- 67 showed highest mean values for the characters namely cob length (12.46 cm), cob diameter (11.35 cm), number of rows per cob (18.29), number of grains per row (20.07), cob weight (56.35), 100 grain weight (18.13 g), yield per plant (41.90 g) and shelling per cent (74.06).

In the progeny of UMI 79/936-C1- 101 also showed highest mean values for the characters namely cob length (11.96 cm), cob diameter (10.61 cm), number of rows per cob (18.77), number of grains per row (20.23), cob weight (56.92), 100 grain weight (19.12 g), yield per plant (40.95 g) and shelling per cent (70.75). The characters of days to 50 per cent tasseling, days to 50 per cent silking and plant height for these progenies almost similar to recurrent parent. Similar results were obtained by Aarthi 2012, [1] Vashishta *et al.* (2013) [7], by Bekele and Rao (2014) [2] and Panwar *et al.* (2013) [6].

Conclusion

To conclude, the present assessment revealed that among the five progenies studied the four progenies *viz*., UMI 79/936-C1-7, UMI 79/936-C1-67, UMI 79/936-C1-67 and UMI 79/936-C1-101 showed better *per se* performance for yield and it's contributing traits *viz*., days to 50 per cent tasseling, days to 50 per cent silking, days to maturity, plant height, ear height, cob length, cob diameter, number of rows per cob, number of grains per row, cob weight, shelling per cent, 100 grain weight and grain yield per plant. Hence, it's an indication that SDM resistant progenies possess the resistance to disease along with better *per se* performance for yield and it' s contributing traits.

References

1. Aarthi P. Molecular marker assisted backcrossing for introgression of sorghum downy mildew resistance into elite inbred of maize *(Zea mays* L.) M.Sc (Ag.) Thesis submitted to the Tamil Nadu Agrl. University. Coimbatore. India; c2012.
2. Bekele A, Rao TN. Estimates of heritability, genetic advance and correlation study for yield and it's attributes in maize (*Zea mays* L.). J of Plant Sci. 2014;2(1):1-4.
3. FAO (Food and Agricultural Organization); c1992. http//www.fao.org.
4. Jeffers D, Cordova HS, Vasal G, Srinivasan D. Beck and M. Barandiaran. Status in breeding for resistance to maize diseases at CIMMYT. In: Vasal SK, Gonzalez Ceniceros F, Fan XM (Eds.). Proc. 7th Asian Regional Maize Workshop. PCARRD, Los Baos, Philippines; c2000. p. 257-266.
5. Rathore RS, Jain ML. Management of Maize downy mildew through resistant varieties. In: Proc. Indian Phytopathological society- Golden Jubilee, International conference on integrated plant disease management for sustainable agriculture; c2000. p.160-161.
6. Panwar LL, Mahawar RK, Narolia RS. Genetic variability and interrelationships among grain yield and yield components in maize. Annals of Plant and Soil Res. 2013;15(1):15-18.
7. Vashishta A, Dixit NN, Dipika SK. Sharma and S. Marker. Studies on heritability and genetic advance estimates in Maize genotypes. Bioscience Discovery. 2013;4(2):165-168.
8. Raymundo-Pinero E, Cazorla-Amorós D, De Lecea CS, Linares-Solano A. Factors controling the SO2 removal by porous carbons: relevance of the SO2 oxidation step. Carbon. 2000 Jan 1;38(3):335-44.