

P_2.13: Yield stability of promising maize hybrids in Thailand

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Introduction

Maize breeding project of Nakhon Sawan Field Crops Research Center (NSFCRC) in Thailand has recently bred several promising hybrids tolerant to drought. However, the yield potential of each hybrid depends on genetics factors, environment (Eberhart and Russel, 1966). Therefore, before those promising hybrid were released to production, they must pass steps of yield evaluation over major maize growing areas in Thailand. This paper is intended to present yield stability of promising maize hybrids tolerant to drought in Thailand.

Materials and Methods

The experiment consisted of five promising hybrids and two commercial hybrids from NSFCRC, three commercial hybrids from private sectors, and NS 2 as a check hybrid. Yield stability and agronomic traits were evaluated across 11 locations during rainy season, 2010. A random complete block design with four replications was used. Individual plot was planted with six rows of 5

meters long with spacings of row to row 75 cm and plant to plant 20 cm. Data were statistically analyzed employing method by Eberhart and Russel (1966).

Results and Discussion

Analyses of variance showed significant difference ($P < 0.05$) due to variety, location and hybrid-location interaction, indicating that hybrids had large difference in yield in different environments. Across 11 locations, mean of days to silking was 53 days with a highly significant variety effect which ranging from 52-55 days. Mean of days to tasselling was 54 days, ranging from 53-56 days. Almost entries had ear placement at about the middle of the plant height. Shelling percentage, ranging from 78.20-83.43%, with a mean of 80.95% (Table 1). Four hybrids NK 48, NSX042007, NS 3 and NSX 042013 produced 5-25% higher yield than the check variety – NS 2 (6.9 t ha^{-1}) at $P < 0.05$. One promising hybrid namely NSX 042007 produced the highest mean grain yield, regression coefficient close to 1.0 and least S^2d (7.8 t ha^{-1} , $b = 0.77$, $S^2d = 0.192$, respectively) (Table 2).

Table 1. Some agronomic characters of promising maize hybrids across 11 locations, Thailand 2010

Hybrids	Days to tasselling (day)	Days to silking (day)	Plant height (cm.)	Ear height (cm.)	Moisture (%)	Shelling (%)
NK 48	53	52	219	114	25.75	78.20
NSX 042007	55	54	191	113	25.62	81.69
NSX 042013	55	54	219	126	24.53	81.27
NSX 052014	53	52	218	116	23.93	79.31
NSX 042022	55	54	207	117	24.22	83.43
CP-DK 888	56	54	227	133	25.43	81.02
Big 919	53	52	196	102	25.11	82.59
NSX 062006	53	52	222	119	25.44	81.01
NS 3	56	55	228	130	24.59	1.74
NS 2 (check)	56	55	230	129	25.11	79.26
Mean	54	53	216	120	24.97	80.95
CV (%)	1.66	1.91	4.75	6.5	6.58	2.61
LSD (0.05)	1	1	4	3	0.69	1.21

Table 2 Mean grain yield (tha⁻¹) of promising maize hybrids and regression coefficient across 11 locations, Thailand 2010

Hybrids	Mean	% Check	b	S ² d
NK 48	8.7	125	1.40	0.450**
NSX 042007	7.8	112	0.77	0.192
NSX 042013	7.3	105	0.87	0.15
NSX 052014	7.2	104	1.09	0.192
NSX 042022	7.1	103	0.84	0.330*
CP-DK 888	7.1	103	1.26	0.639**
Big 919	6.7	97	1.01	0.382**
NSX 062006	6.4	93	0.74	0.131
NS 3	7.4	107	1.04	0.281
NS 2 (ck.)	6.9	100	0.98	0.079*
Mean	7.3	105	-	-
CV (%)	10.38	-	-	-
LSD (0.05)	0.3	-	-	-

Conclusions

The experiments indicated that hybrids performed differently in different locations. NK48, NSX042007, NS3 and NSX 042013 produced 5-25% higher yields than NS2. However, only one promising NSX042007 produced consistently high yield over 11 tested environments (7.8 tha⁻¹, b = 0.77, S²d = 0.192).

References

- Eberhart, S.A. and W.A. Russel. 1966. Stability parameters for comparing hybrids. *Crop Sci.* 6 : 36-40.