Registration of "*Abdissa* and *Moti*" Trriticale (*X-Triticosecale wittmack*) Varieties

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Abstract: Triticale varieties that have pedigeree names TCL-76 and TCL-61 and common names "Abdissa and Moti", respectively, were collected from Kulumsa Agricultural Research Center and evaluated under a regional variety trial for two years and released by Bako Agricultural Research Center. These varieties were evaluated for two consecutive years at Shambo, Gedo and Arjo districts and for one year at Diga district of western Oromia. The varieties performed well and were found to be tolerant to the major diseases (Septoria, leaf, and stem rusts) in the area. Multi environmental trial (MET) analysis indicated that these varieties have better yield and agronomic performances than the standard check (Dilfekar) and are most stable across the years and locations.

Keywords: Triticosecale wittmack; Pedigeree

1. Introduction

Triticale (X-Triticosecale Wittmack) is a man-made crop developed by crossing wheat (Triticum turgidum or triticum aestivum) with rye (Secale cereale). It is an amphidiploid crop with 2n = 56 chromosomes (42 from wheat and 14 from rye) (Allard, 1960). It can adapt to a wide range of soil conditions ranging from sandy to clay soil type and also exhibited better performance under acidic and degraded soils compared to many other cereals (MARD, 2006

2. Agronomic and Morphological Characteristics

Abdissa and Moti are characterized by their awn and awnless characteristics respectively. Easy threshing ability is one of the best characteristics of the Moti variety. When compared to other triticale varieties, the seed of Moti is larger than that of Abdissa. Moti has also bigger spike than Abdissa. The seed color of both varieties is creamy white (Table 4) Both varieties have an erect growth habit and are resistant to lodging.

3. Yield Performance

The two varieties were evaluated against thirteen genotypes and one standard check variety, Dilfekar, at Shambo, Gedo, Arjo and Diga districts of western Oromia for two consecutive years (2011 and 2012) for their adaptability and yield performance. Among the tested genotypes Abdissa and Moti performed better with grain yields of 5.6 and 4.7 t ha^{-1}, respectively, than the standard check (4.6 t ha^{-1})(Table 2). Moreover, these varieties were evaluated by farmers following a participatory approach and TCL-61 (Moti) variety was selected due to its easy threshing ability and bigger spike length since spike length is mainly associated with the number of seed per spike and the size of the seed.

4. Stability Performance /Adaptability

Yield stability for fifteen *Triticale* genotypes and the standard check was studied for stability across environments. According to Ebrehart and Russell (1996), the genotype with higher mean grain yields, unity regression coefficient (b_i) and the value for squared deviation from regression (s^2di) approaching zero are stable and widely adaptable. Accordingly, genotype TCL-76 (Abdissa) had the highest grain yield and the regression coefficient (b_i) was significantly higher than unity. This implied that this genotype is highly responsive to the change in environment and could be recommended for western Oromia and similar agro-ecologies of the country with appropriate agronomic practices. However TCL-61 (Moti) had comparable grain yield with the standard check and the regression coefficient (b_i) was slightly lower than unity (0.976).

5. Disease Reaction

Abdissa and Moti are resistant to the predominant diseases; Septoria (*Septoria tritici*), leaf (*Puccinia recondata*) and stem rust (*Puccinia graminis*) of the area.

6. Conclusion

Abdissa (TCL-76) produced the highest mean grain yield but the regression coefficient (b_i) was significantly higher than unity. This indicates that this variety is highly responsive to the change in environment and recommended for specific locations of western parts of the country with appropriate agronomic practices. Even though the regression coefficient (b_i) of Moti (TCL-61) was slightly lower than unity. It is an awnless triticale variety which has long spikes, and better disease reactions across the tested environments. Though this variety has comparable yield with the standard check, it is preferred by farmers due to its easy threshing, and is recommended for Shambo, Arjo,

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Gedo and areas with similar agro-ecological conditions in the country.

7. References

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Table 1. Phenological, growth, and agronomic performances of the varieties in 2010 and 2011 G.C at Shambo, Gedo and Arjo sub-sites.

	Days to heading							Days to maturity					
	2010			2011				2010		2011			
Acc	Gedo	Shambo	Arjo	Gedo	Shambo	Arjo	Mean	Gedo	Shambo	Gedo	Shambo	Arjo	Mean
TCL-76	66.3	63.3	73.0	64.5	64.5	72.0	67.3	135	127.0	154.8	133.3	141.8	138.4
TCL-61	66.5	63.3	75.3	62.3	66.3	74.2	68.0	134	125.3	154.0	131.5	143.5	137.7
Dilfikir	60.8	59.8	79.0	61.0	60.2	79.0	66.6	136	124.0	154.0	132.8	144.0	138.2
Mean	64.5	62.1	75.8	62.6	63.7	75.1		135.0	125.4	154.3	132.5	143.1	
CV	2.71	2.1	3.6	2.80	2.4	2.8		1.67	0.86	0.64	1.0	1.6	
LSD (5%)	2.0	1.5	3.2	2.2	1.8	3.3		3.20	1.55	1.2	1.5	2.8	
F-value	**	**	NS	**	**	**		*	**	NS	**	**	

*Where, CV = Coefficient of variation; * = Significant at 5% level of significance; ** = Significant at 1% level of significance; LSD = Least Significant Test at 5% level of significance; TKW = Thousand kernel weight; ACC= Accession, 1000KW= Thousand kernel weight*

Table 2. Phenological, growth, and agronomic performances of the varieties in 2011 G.C at Shambu, Gedo and Arjo sub sites.

	Plant height (cm)							Grain yield (t ha^{-1})							
	2010			2011				2010			2011				Mean
Acc	GD	SH	AR	GD	SH	AR	Mean	GD	SH	AR	GD	SH	AR	DG	
TCL-76	101	109.8	96.8	114.0	111.8	101.3	106	2.365	6.580	6.288	7.62	7.18	5.68	3.99	5.67
TCL-61	110	112.3	90.5	110.0	107.0	101.0	105	2.775	5.050	4.524	6.48	6.03	5.61	2.86	4.76
Dilfikir	110	114.0	94.5	112.0	109.0	97.8	106	2.664	5.240	5.59	5.82	6.74	5.14	1.50	4.66
Mean	107.	112.0	93.9	112.0	109.3	100.0		2.60	5.62	5.45	6.64	6.65	5.48	2.78	
CV	4.39	3.68	6.08	3.45	5.3	7.23		NS	*	*	17.2	16.4	18.6		
LSD (5%)	7.13	6.42	8.17	4.9	7.1	9.2		NS	*	*	13.54	11.58	15.66		
F-value	**	**	*	**	**	**		NS	*	*	NS	*		NS	

Where, GD = Gedo; SH= Shambo; AR=Arjo; DG=Diga

Table 3. Analysis of variance for Additive Mean Effect and Multiple Interactions (AMMI).

Source	Df	MS	%G x E interaction explained
Environments	6	105.87**	
Reps within Env.	21	4.29	
Genotype	15	2.30*	
Genotype x Env.	90	1.67**	
IPCA 1	20	3.30**	43.86
Total	447		
Residual	315	1.09	

Table 4. General characteristics of the varieties.

Characteristics	Varieties	
	Abdissa (TCL-76)	Moti (TCL-61)
Pedigree	ARDI/GNU//2*FAHAD_1/4/ERIZO_6/NIMIR	BULL_10/MANATI_1//FARAS/CMH84.414
Adaptation area:		
Altitude requirement (masl)	1800-2700	1800-2700
Rainfall requirement (mm)	>600mm	>600mm
Fertilizer rate		
DAP (kg ha^{-1})	100	100
Urea (kg ha^{-1})	50	50
Fertilizer application method and time		
DAP	Row application at planting	Row application at planting
Urea	Row application at 3-4 leaf stage	Row application at 3-4 leaf stage
Seeding rate (kg ha^{-1})	125-130	125-130
Spacing (cm)		
Between rows	20 cm	20 cm
Planting date	Late June – Early July	Late June – Early July
Days to heading	63-73	63-75
Days to maturity	127-154	127-154
1000 seed weight (g)	44.2	40.4
Plant height (cm)	97-114	125-154
Awn presence	Present	Awn less
Seed color	White Cream	White Cream
Growth habit	Erect	Erect
Grain yield (q/ha)		
On farmers field	40-50	38-45
On-station	44-62	40-53