Registration of *Ilani* and *Oda* Durum Wheat Varieties for Highlands of Bale

Tesfaye Letta*, Feyisa Taddese, and Desalegn Lemma

Sinana Agricultural Research Center, P O Box 208, Bale-Robe, Ethiopia

Abstract: Two durum wheat (*Triticum durum* desf.) varieties: *Ilani* (DZ 2234) and *Oda* (DZ 2227) developed by Sinana Agricultural Research Centers were released for production in highlands of Bale similar agro ecologies. These varieties were selected and evaluated at Sinana on-station and three on-farms in highlands of Bale for three consecutive years and they were proved to have stable, high yield and superior industrial qualities. They were also proved to have resistance to stem, yellow and leaf rusts. Multilocation testing in the regional variety trial confirmed their productivity with above-average yield performance in all environments and demonstrated their yield stability compared to the commercial durum wheat cultivars Foka, Cocorit-71 and Ingiliz.

1. Agronomic and Morphological Characteristics

The agronomic and morphological characteristics of Ilani and Oda varieties, and the checks are given in appendices I and II.

2. Yield Performance

Multilocation testing was conducted within the regional variety trial, which consisted 20 durum wheat genotypes including two standard checks (Foka and Cocorit-71) and one local check (Ingiliz). The trial was grown at four sites for three consecutive years covering the durum wheat growing environments in the highlands of Bale. The results of the trial provided useful information on variety adaptation and yield stability. Yield performance of the multilocation testing for promising genotypes among the twenty genotypes is summarized in Table 1.

Location by year mean yields of each of varieties *Ilani* and *Oda* were higher than all entry mean yields for the tested seasons. They were also higher than the mean yields of the two standard checks, Foci and Cocotit-71, and a local check (Ingiliz). Based on the grand mean, *Oda* out yielded the standard check, Foka by 17.5% and Local check by 12.8% and *Ilani* out yielded Foka by 11.4% and the local check by 7%. These two varieties also proved to have higher average yield ranges (Table 1). In addition, *Oda* was the top yielder at six environments and *Ilani* at four environments. In conclusion, the yield performance of the varieties was above average in many environments, and both varieties were superior to Foka and Ingiliz in their grand mean.

3. Stability Performance

Regression coefficients (b) and deviation from regression (S^2d) were calculated as stability parameters for three years. Eberhart and Russell (1966) defined a stable variety as one with unity regression coefficient and small deviations from regression. Accordingly, *Ilani* was stable for two seasons (1999/2000, and 2000/2001), and *Oda* for one season (2000/2001), Foka for two season (1999/2000, and 2000/2001), and Kilinto for one season (1999/2000). It can thus be concluded that *Ilani* is the best in yield stability and superior to the check varieties, and the genotype *Oda* is comparable in stability to Foka.

4. Reaction to Stem, Yellow and Leaf Rusts

Reactions to stem, yellow and leaf rusts were recorded for all genotypes at all sites (Table 1). The scores of the two varieties were less than 20Ms; therefore, the varieties may be considered to have adequate resistance to all the three rust diseases. However, all checks were found to be susceptible to ether of the three rusts relative to the newly released varieties. Therefore, the varieties are more resistant to the three rusts.

5. Quality Analysis

The quality analysis of both physical grain analysis and chemical wheat flour analysis were presented in Tables 2 and 3, respectively. The result showed that both *Ilani* and *Oda* varieties have the best hectoliter weight and vitreousness qualities from physical quality parameters, and best wet gluten and falling number from chemical quality parameters. These released varieties were highly appreciated and accepted by food factories as their quality met required standards.

6. Conclusions

The durum wheat varieties Ilani and Oda had above average yield performance in most test environments, out yielded the Foka and Ingiliz. They have also better yield stability than checks. They are more resistant to stem, yellow and leaf rust diseases, have good agronomic characteristics, and are superior in quality. They are, therefore, released for production in all wheat growing environments in the highlands of Bale and other locations with similar agro ecologies.

7. Reference

Eberhart, S.A. and W.A. Russell. 1966. Stability parameters for comparing varieties. *Crop Science* 6: 36-40

*Corresponding author. E-mail: tesfaye_letta@yahoo.com

ISSN 1992-0407

Table 1. Mean agronomic traits and disease measured on two released durum wheat varieties and checks in multi location testing, 1999-2001

Genotypes	DH	DM	PH (cm)	LR (%)	SR (%)	YR (%)	SP (00-99)	BM (t/ha)	TKW (g)	Mean yield (over years And locations) (t/ha)
DZ 2227 (Oda)	72	137	110	20Ms	10Ms	20Ms	73	7.76	47.46	3.76
DZ 2234 (Ilani)	64	135	96	20Ms	15Ms	20Ms	73	6.42	51.12	3.56
Foka	70	137	120	20S	40S	25Ms	73	7.71	44.43	3.20
Cocorit-71	67	135	84	20S	15Ms	30Ms	83	6.36	43.18	3.47
Ingliz	71	137	113	40S	20Ms	25Ms	73	6.02	41.75	3.33

DH= days to heading, DM= days to maturity, PHT=plant height, LR= leaf rust= stem rust, YR= yellow rust, SP= septoria, BM= biomass,and TKW= thousand kernels weight

Table 2. Durum wheat varieties physical quality parameters as analysed by Kality Share company, Ethiopia.

Variety	Impurity (%)	Moisture content (%)	Hecto liter weight (kg/hl)	Odour	Vitreousness (%)
DZ 2227 *(Oda)*	3.8	7.6	83.75	Normal	98
DZ 2234 *(Ilani)*	5.5	8.5	83.95	Normal	99
Foka	5.4	8.2	80.80	Normal	94
Kilinto	6.0	8.3	83.30	Normal	75
Ingliz	5.0	8.1	82.15	Normal	89

Table 3. Durum wheat varieties chemical quality parameters as analysed by Kaliti food Share Company,Ethiopia

Variety	Moisture content (%)	Wet gluten content (%)	Ash (%)	Falling number (Second)
DZ 2227 (*Oda*)	14.4	37.6	1.95	308
DZ 2234 (*Ilani)*	14.5	44.6	1.25	322
Foka	13.7	46.5	1.55	284
Kilinto	14.2	29.6	1.96	250
Ingliz	12.9	39.4	1.46	291
specification	14.5 max.	33.0 min.	2.0 max	250 min.

Appendix I (Variety Oda (DZ 2227))

Variety: DZ 2227 (Oda)

Pedigree: DZ046881/imlo//cit 71/3/RCHI/LD 357//imlo/4/Yemen/Cit's'//Plc's'/3/Taganroy

1. Agronomic and Morphological Characteristics:
   - 1.1 Adaptation area: Highlands of Bale
     Altitude (m.a.s.l.): 2300-2600
     Rainfall (mm): 750-1000
   - 1.2 seed rate: 150 kg/ha
   - 1.3 planting date: End July-Late August
   - 1.4 Fertilizer rate: 41/46 N_2PO_5 kg/ha
   - 1.5 Days to heading: 72 days
   - 1.6 Days to maturity: 137 days
   - 1.7 Plant height (cm): 110
   - 1.8 Growth habit: Erect
   - 1.9 Test Weight: 82.8
   - 1.10 1000 seed weight (g): 47.46
   - 1.11 Seed color: Brown
   - 1.12 Plant stature: tall
   - 1.13 Spike: red color, awned
   - 1.14 Kernel: Ovate, mid long in shape, and hard
   - 1.15. Crop pest reaction:Yellow rust 20Ms, Leaf rust 20Ms, and Stem rust 10Ms
   - 1.16 Yield (t/ha):
     Research field: 3.8-5.3
     Farmer field: 3.8
2. Year of release: 2004/05
3. Breeder/maintainer: SARC (Sinana Agricultural Research Center)

Appendix II (Variety Ilani (DZ 2234))

Variety: DZ 2234 (Ilani)

Pedigree: Imilo/Rahum//A4#72/3/Gerardo

1. Agronomic and Morphological Characteristics:
   - 1.1 Adaptation area: Highlands of Bale
     Altitude (m.a.s.l.): 2300-2600
     Rainfall (mm): 750-1000
   - 1.2 seed rate: 150 kg/ha
   - 1.3 planting date: End July-Late August
   - 1.4 Fertilizer rate: 41/46 N_2PO_5 kg/ha
   - 1.5 Days to heading: 64 days
   - 1.6 Days to maturity: 135 days
   - 1.7 Plant height (cm): 96
   - 1.8 Growth habit: Erect
   - 1.9 Test Weight: 80.4
   - 1.10 Thousand seed weight (g): 51.12
   - 1.11 Seed color: Brown
   - 1.12 Plant stature: medium height
   - 1.13 Spike: Oblong to tapering, mid long, fusiform, and white in color
   - 1.14 Kernel: Elliptical in shape, and hard
   - 1.15 Crop pest reaction: Yellow rust 15Ms, Leaf rust 20Ms, and Stem rust 10Ms
   - 1.16 Yield (t/ha):
     Research field: 3.5-5.5
     Farmer field: 3.6
2. Year of release: 2004/05
3. Breeder/maintainer: SARC (Sinana Agricultural Research Center)