

Yield Trial of Sixteen Tall and Dwarf Wheat Varieties (*Triticum aestivum* L.) Grown in the Libyan Desert

M. A. EL-SHARKAWY AND K. SGAIER¹

ABSTRACT

The grain yield and grain size of 16 varieties of common wheat (*Triticum aestivum* L) were compared under the desert conditions of Al-Kufra oasis in the southern region of the Libyan Arab Republic. Sidi-Misri 1, a local selection from the dwarf Mexican wheat, was found to be the highest yielding variety (5.240 tons/ha). On the other hand the commonly used variety, Florence Aurora, was significantly lower in grain yield (3.464 tons/ha).

The grain size, as estimated by the weight of 1,000 grains, for Sidi Misri 1, Florence Aurora and many other varieties were greatly reduced when grown under the conditions of Al-Kufra oasis.

INTRODUCTION

Wheat is the second major cereal crop in Libya with annual average production of about 30,000 tons (2). Most of the common wheat, *Triticum aestivum* L, is grown mostly in the narrow coastal strip and in the oasis (1,3,4). Wheat varieties are in general grown either under rain-fed conditions in the coastal strip where rainfall ranges between 200 to 700 mm during the growing season, or under irrigation in the oasis of Fezzan, Cyrenaica and Tripolitania (2). The soils in these area ranges from fine sandy to heavy clay soils. The principal varieties grown in these regions are well adapted to the semi-arid and desert conditions, but their yield potential is rather low. In recent years there was a considerable effort for introducing and selection of new varieties and strains of common wheat adapted to local conditions (7).

One of the most promising varieties, 'Sidi Misri-1', is a local selection from the Mexican dwarf wheat (7). This variety has been tested at different locations and was found to be the highest yielding variety compared to local and other introduced and selected varieties (7). However, 'Sidi-Misri-1', was not tested, in comparison with other varieties, under Al-Kufra oasis conditions. Al-Kufra oasis is located in the south eastern part of the Libyan desert at a latitude of 24°N and at a longitude of 23°E. Recent discoveries of huge quantity of good quality ground water in Al-Kufra had led to the

¹ Agronomists, Department of Plant Production, Faculty of Agriculture, University of Tripoli, LIBYA.

establishment of a fully mechanized Project for sheep raising as well as cereal production (5). About 10,000 hectares are expected to be planted with forage and cereal crops in the foreseeable future. The climatic conditions in Al-Kufra is typical of the desert and arid regions. The minimum and maximum temperature, in July and January are 18°, 37°C and 3°, 19°C, respectively. The annual average relative humidity and annual rainfall are 50% and 2.5 mm, respectively. The soil of Al-Kufra region is sandy soil which consists of more than 90% coarse sand, 2–6% silt and 1–4% clay. The soil contains less than 0.5% total nitrogen and less than 1% organic matter. The pH of the soil ranges from 7.4 to 8.3 (5).

The objective of this work is to study the yielding ability of the variety 'Sidi-Misri-1' in comparison with some other strains and varieties of common wheat under the prevailing conditions of Al-Kufra region.

MATERIALS AND METHODS

A field experiment was carried out at the farm of Al-Kufra agricultural Project. Sixteen varieties of common wheat namely; Sidi-Misri-1, Florence Aurora, Chhoti Lerma, Kalyan Sona, Safed Lerma, Lerma Rojo 64A, Pitic 62, Penjamo 62, Nortens M67, NP 881, Sharbati Sonora, FAO 14668, Line I Sidi Misri, Giza 154, Siete Cerros 66, and Sonora 64 were planted on November 25, 1970. Each variety was planted in a plot consisting of 6 lines 20 cm apart and 6 meters long. The plots were arranged at random in 4 replicates. About 150 kg N, 60 kg P₂O₅ and 55 kg. Zinc in the form of Zinc sulfate per hectare were applied before seeding. Before and after the tillering stage, a 50 kg N/ha were applied as a top-dressing. Irrigation was regularly applied by sprinklers during the growing season. The grain yield and grain size were determined at the harvest time in May.

RESULTS AND DISCUSSION

The analysis of variance of total grain yield and the average yield per hectare for the 16 wheat varieties are shown in Tables 1 and 2, respectively.

There was a highly significant difference in the yielding ability among these varieties (Table 1). The average grain yield ranged from 1.957 to 5.240 tons/ha with Sidi-Misri-1, and NP 881 as the highest and lowest yielding varieties, respectively. It appears from the present data that some of the varieties originating from the dwarf Mexican wheat as represented by Sidi-Misri-1, and Sonora 64 are well adapted to the local conditions of Al-Kufra region. The currently used variety, Florence Aurora, was considerably low in yielding ability (3.464 tons/ha) compared with the dwarf Mexican wheat (5.240 tons/ha). These results are in agreement with other reports on yield of common wheat in regions other than Al-Kufra oasis (7).

Tables 3 and 4 show the analysis of variance and the average weight of 1,000 grains, respectively. There was a highly significant difference in the grain size among the varieties tested (Table 3). The average weight of 1,000 grain, ranged from 24.25 and 40.53 gm with Pitic 62 and Kalyan Sona being the smallest and the largest in grain size, respectively (table 4). The weight of 1,000 grains of Sidi-Misri-1 (28.40 gm) is considered small compared with other varieties, whereas Florence Aurora is considered large in grain size (39.70 gm). When grown in Tripolitania, near the coastal strip, the weight of 1,000 grains of both Sidi-Misri-1 and Florence Aurora were found to be greater (40–42 gm, and 52–55 gm, respectively) than Al-Kufra region (6,8). Also, the weight of 1,000 grains

Table 1 Analysis of variance of grain yield for 16 varieties of common wheat.

Sources of variation	d.f.	S.S.	M.S.	F
Replicates	3	63,555.64	21,185.21	
Varieties	15	2,091,266.80	139,417.79	3.32 ¹
Error	45	1,891,758.61	42,039.08	
Total	63	4,046,581.05		

¹Highly significant

Table 2 Average grain yield (tons/ha) for 16 varieties of common wheat.

Variety	Grain yield (tons/ha)	Variety	Grain yield (tons/ha)
Sidi-Misri-1	5.240	Chhoti Lerma	3.700
Sonora 64	5.089	Florence Aurora	3.464
Kalyan Sona	4.791	Pitic 62	3.405
Line I Sidi-Misri	4.614	Siete cerros 66	3.173
Safed Lerma	4.580	Penjamo 62	3.131
Sharbati Sonora	4.413	Giza 154	2.862
FAO 14668	4.242	Nortens M 67	2.744
Lerma ROJO 64A	3.923	NP 881	1.957

L.S.D.5% = 1.457 tons/ha.

Table 3 Analysis of variance of weight of 1,000 grain, for 16 varieties of common wheat.

Source of variation	d.f.	S.S.	M.S.	F
Replicates	3	33.00	11.0	
Varieties	15	1,417.99	94.53	10.59 ¹
Error	45	401.91	8.93	
Total	63	1,852.90		

¹Highly significant.

Table 4 Average weight of 1,000 grains (gm) for 16 varieties of common wheat.

Variety	Wt. of 1,000 grains (gm)	Variety	Wt. of 1,000 grains (gm)
Kalyan Sona	40.53	Lerma Rojo 64A	30.33
Florence Aurora	39.70	Giza 154	29.70
Norten SM 67	39.35	Penjamo 62	29.38
NP 881	35.13	Sidi-Misri-1	28.40
Sonora 64	33.50	Sharbati Sonora	28.35
FAO 14668	32.75	Line I Sidi-Misri	27.05
Safed Lerma	32.55	Siete Cerros 66	26.68
Chhoti Lerma	30.45	Pitic 62	24.25

L.S.D. 5% = 4.24 gm.

of many of the wheat varieties reported in the present studies were found to be considerably lower than when grown in Tripolitania (7).

Therefore, it is concluded from the present investigation, that the grain size of Sidi-Misri-1 and many other varieties of common wheat were extremely reduced when grown under the conditions of Al-Kufra oasis.

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