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Table 1. Effect of different soil-moisture treatments on seed germination (%) of six durum wheat cultivars.

Treatment			Cultivar					
Identification No.	Soil moisture (%)	Description	Bidi 17	Hedba 3	Oued Zenati 368	Cocorit	INRAT 69	Polonicum
I	57.5	Water saturation	23	47	47	29	28	15
II	36.6	Field capacity	96	96	98	86	98	95
III	18.5	50% field capacity	55	79	84	67	72	84
IV	11.5	Wilting point	Slight increase in seed volume due to some water absorption					
V	4.3	Extremely dry	no visible change					

Table 2. "Catch up" germination following repeated irrigations of soils subjected to treatments IV and V.

Treatment	Soil moisture content (%)		Germination (%)					
	Initial	Final	Bidi 17	Hedba 3	Oued Zenati 368	Cocorit	INRAT 69	Polonicum
IV	11.5	18.8	17	25	22	16	26	20
	18.8	22.4	24	30	33	21	36	32
	22.4	27.0	29	39	34	23	38	37
V	4.3	11.8	7	14	13	3	2	13
	11.8	15.5	22	28	25	20	24	34
	15.5	19.3	42	48	35	23	43	51

and Oued Zenati 368 thus appear to be more adapted to large soil moisture fluctuations than exotic cultivars.

In dry soil conditions, Polonicum showed a good germination potential, similar to Oued Zenati 368. It is perphaps important to note that this cultivar is derived from a cross involving the local cultivar Zenati Bouteille.

For the soil treatments IV (soil at wilting point) and V (driest soil conditions), soil water absorbed by the seeds was determined by comparing the weight of the planted seeds with the mean weight of dry seeds. It was found that all cultivars have pumped water from the soil in treatment IV but not in treatment V where only Cocorit, INRAT 69, and to a lesser extent Hedba 3 were able to extract some moisture from the soil.

"Catch up" germination was assessed through repeated irrigations of soil previously subjected to treatments IV and V (Table 2). It was found that sown seeds that were initially dry (as in treatment V) germinated better following irrigation in comparison to seeds that have previously absorbed some moisture as in treatment IV. Thus sowing in dry soils may be hazardous to normal seed germination if soil and seed conditions are conducive to partial imbibition of seeds.

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References

Cote, M. 1974. Les regions bioclimatiques de l'Est algérien. Revue scientifique du CURER et de l'Université de Constantine. 11 pp, 2 cartes.

Owen, P.C. 1952. Relation of germination of wheat to water potential. Journal of Experimental Botany 3(8): 188-203.

Seed Germination of Six Durum Wheat Cultivars in Relation to Soil Moisture

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In subhumid and semiarid areas of eastern Algeria, large and unpredictable climatic variations are frequent (Cote 1974). The occurrence of early rains, in particular, varies greatly from year to year which may considerably affect seed germination and hence cereal production in those areas.

The present experiment is designed to study the seed germination of six different durum wheat (*Triticum turgidum* L. var *durum*) cultivars grown in Algeria and the effect of soil moisture on germination.

Materials and Methods

The study was conducted in Nov and Dec 1982 using six cultivars: three from Algeria; Bidi 17, Hedba 3, and Oued Zenati 368, all selected from local landraces, two introduced cultivars; Cocorit from CIMMYT, Mexico, and INRAT 69 from Tunisia, and one (here after referred to as Polonicum) derived from a cross made at CNRA between a *Triticum polonicum* line and a dwarf selection of Zenati Bouteille.

All seeds are derived from the season's harvest except the seed of Cocorit which is obtained from the previous crop season.

Germination Potential: Germination potential has been measured by percent germination of 100 seeds placed on a blotting-paper in covered Petri dishes placed in the laboratory at ambiant temperature (10-18°C). Four replications were used for each cultivar and germinated seeds were counted daily until a constant number of seedlings was reached which occurred in about 15 days. Due to seed infection by fungal diseases in certain samples, readings were repeated after appropriate fungicidal treatment.

Mean Germination Time: Mean germination time (MGT) for treated seed was calculated as:

$$MGT = \frac{I}{N}\sum n_i d_i$$

Where n_i is the number of germinated seed on day "i", d_i is the rank order of day "i", and N is the total number of germinated seed.

Soil Moisture Content: Soil was sampled from the upper soil layer (20 cm) at El Khroub Research Experiment Station. It was irrigated to saturation and let dry slowly. Subsamples were taken at different dates and placed in Petri dishes, then 50 seeds were put to germinate in each Petri dish. Germination was thus studied for a gradient of soil moisture from saturation to below wilting point. "Catch up" germination was examined following irrigation of dried soil.

Results and Discussion

Germination Potential: Germination potential was similar for all cultivars except Polonicum which showed significantly lower germination potential when seeds were left untreated. However, after fungicide was applied, all varieties showed no significant differences with a mean germination percent of 83 for Cocorit, 93 for Polonicum, 94 for INRAT 69, 97 for Bidi 17, 98 for Oued Zenati 368, and 99 for Hedba 3.

These results indicate that heavy disease infection of seed for cultivars such as Polonicum may seriously inhibit germination, and this confirms the results obtained by Owen (1952).

Mean Germination Time: Germination started on the fourth day of sowing and ended on the eleventh, with a maximum occurring on the sixth or seventh day, depending on the cultivar. The mean germination time was 6.2 days for Bidi 17, 5.4 for Hedba 3, 5.7 for Oued Zenati 368, 6.9 for Cocorit, 6.1 for INRAT 69, and 6.7 for Polonicum. The long germination time for Cocorit may be attributed to the poor-quality seeds used.

Effect of Soil Moisture: Results in Table 1 show that germination in water-saturated soil was not the same for all cultivars. In particular, Hedba 3 and Oued Zenati 368 seem to be better adapted to such soil conditions which, however, are rare in Algeria. These two cultivars also showed a good germination of around 80% in relatively dry soils (18.5% of soil moisture).

Except for Polonicum, all cultivars exhibited a drastic decrease in germination potential in both saturated and dry soils. The local cultivars Hedba 3