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## The Germination of European Type Olive Seed as Affected by Different Sowing Methods

Azmat Ali Awan, Aqib Iqbal and Ghulam Idris

Pakistan Oilseed Development Board Agricultural Research Institute, Tarnab, Peshawar, Pakistan

**Abstract:** Effect of different cultivation methods on germination percentage, seedling height and number of leaves per seedling of European type Olive was investigated. The results revealed that sowing of seeds on raised bed resulted maximum germination percentage, seedling height and number of leaves per seedling. Minimum germination percentage, seedling height and number of leaves per seedling was recorded when sowing the seeds on flat land. Sowing of cultivated Olive seeds on raised beds is therefore recommended for obtaining higher germination percentage.

**Key words:** *Olea cuspidata*, seed germination, sowing method

### Introduction

Olive (*Olea cuspidata*) is one of the potential crops for obtaining autarky in edible oil production. The fruits of Indian olives (*Olea cuspidata*) contain approximately 15-17% oil whereas the fruit of European type olives (*Olea europea*) contain 20-30% oil. The major constraint in increasing the European type Olives (*Olea europea*) is its difficulty to root from its cuttings, the rooting success is low even with treating the cuttings with 3000 ppm IBA solution. Wild olive (*Olea cuspidata*) of Oleaceae family is usually propagated by seed. In Greece olive is propagated by seed, cutting and sucker, but the commonest method is the use of seed, Anagnostopoulos (1931). Sowing of olive seed takes place after soaking in water for 10-15 days or in order to hasten their germination, using scarification method by means of low concentration of acid or basic solutions for a few hours, Agrotec (1989). Olives can be propagated by seed as well from cuttings. The traditional and natural method of olive propagation is by seed. The ripe fruits of Indian Olive (*Olea cuspidata*) or of commercial cultivars are collected in the months of Sept-Oct and the stones are extracted from pulp by dipping them either in a lye solution or in a solution containing dilute HCL, Singh and Sharma (1982). These stones are then thoroughly washed in running water to remove all traces of the chemical and are immediately sown in nursery bed at a distance of 10 cm between rows and 5 cm from seed to seed. Seeds start germinating with the onset of summer season and germination continues for a period exceeding one year and complete germination takes even two years. The rate of germination is quite low Basso (1962). The extent of seed germination depends on the cultivars, stage of seed maturity, storage time and morphological factors including the presence of a hard seed-coat reported, Lalatta (1959), Singh and Sharma (1982). Voyiatzis and PrOlingis (1987) and Canas *et al.* (1987)

reported that germination frequency was higher in embryos of fruits collected at 4-6 months after full bloom. Lagarde *et al.* (1983), while working on the seed germination of intact excised seeds, found that seed coat imposed dormancy inhibiting seed germination. Trading European olive seeds for one month at a temperature of 10°C followed by a period two months at 20°C was found to be optimum for improving germination.

### Materials and Methods

An experiment to study the effect of different cultivation methods on germination and performance of European type of olive seeds was conducted at Agricultural Research Institute, Tarnab, Peshawar Pakistan during November 2002. The experiment was laid-out in Randomized Complete Block Design with five replications. The seeds were soaked in water for 15 days and then treated with 5% HCL, followed by rain with tap water. Pulp was removed from the seeds before sowing and 500 seeds of uniform sizes were used during the experiment in each treatment. The seeds were sown on

- Raised-bed
- Flat land
- Ridges

The data were recorded on germination percentage, seedling height and number of leaves per seedling. The data obtained were analyzed using the RCB design and upon obtaining significant differences, least significant difference (LSD) test was employed at 5% level of probability for comparison of treatment means.

### Results and Discussion

**Germination Percentage:** Data regarding effect of different cultivation methods on germination percentage are presented in Table 1. The data manifested that

Table 1: Germination percentage

Treatment	R1	R2	R3	R4	R5	Percentage
Raised bed	62	70	55	65	92	69A
Flat land	20	30	15	35	30	26C
Ridges	35	45	45	35	50	42B

LSD at 5% = 11.70

Table 2: Seedling height (cm)

Treatment	R1	R2	R3	R4	R5	Percentage
Raised bed	4	4.33	3.66	3.66	4	3.93A
Flat land	3.66	3.33	3.33	2.66	3	3.19B
Ridges	3	3.33	3.33	4	4	3.53AB

LSD at 5% = 0.6407

Table 3: Number of leaves per seedling

Treatment	R1	R2	R3	R4	R5	Percentage
Raised bed	4	4.66	3.33	4	4	3.99A
Flat land	2.66	2.66	2.66	2	2.66	2.52C
Ridges	2.66	3.33	2.66	3.33	4	3.19B

LSD at 5% = 0.6407

different treatments have a significant effect on germination percentage of the olive seeds. It is clear from data that maximum germination percentage (69%) was recorded when seeds were sown on raised beds, followed by ridges (42%). Minimum germination percentage (26%) was noted when seeds who were sown on flat land. The seed sown on raised bed got a well drained aerated soil provided which ideal condition provided for optimum germination of the seed.

**Seedling height:** Data regarding effect of different cultivation methods on seedling height are presented in Table 2. The data exhibited showed statistically significant differences for seedling height (3.93 cm) was when the seeds were sown in raised bed. It was followed by ridges (3.53 cm), while minimum seedling height (3.19 cm) was obtained on flat land. The maximum seedling height was obtained on raised beds because of the two synergistic factors becomes the seed were germinated earlier on raised bed and got maximum time for attaining seedling height. Secondly the condition for growth and development of Olive on raised bed were ideal which produced maximum height as compared to seedling on flat land.

**Number of leaves per seedling:** Statistical analysis of the data recorded for number of leaves per seedling reveal that the treatments are significantly different. The data presented in Table 3 indicate that maximum number of leaves (3.99) was obtained when the seed was sown on raised beds followed by ridges (3.19). Minimum number of leaves (2.52) was noted in flat land. The maximum number of leaves per seedling were produced because the raised bed provided ideal conditions for the growth and development of roots which got maximum nutrients from the soil and in-turn produced maximum number of shoot and leaves.

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