

THREE NEW GERMINATION MEDIA TESTED FOR POSSIBLE USE IN FOREST NURSERIES

M. SAADI GHARIB ¹ Ph.D.

Introduction

After being watered, mineral soils often crust quickly. This crusting prevents the delicate radicles of the top-sown seeds from penetrating the crust. The crust prevents the needle tips or the seedcoats of covered seeds from pushing through the soil surface, resulting in only partial germination.

To find a solution to the problems resulting from crust formation, attempts have been made in forest nurseries to use various other germination media instead of mineral soils. Dunemann (1939) proved that spruce needles serve as a good medium for raising conifer seedlings. A series of experiments by Selcuk (1956), Wagner (1958), and Gharib (1965) followed the Dunemann scheme. These indicated that the germination, growth, and survival were better in the spruce litter than in the mineral soils. This material, however, is not available in northern Iraq, because of the scarcity of conifer forests.

To test other new types of germination media available in the northern regions of Iraq, the experiment reported here was begun at the University of Sulaimaniyah in the fall of 1969.

Materials and Methods

Three kinds of material were used. Cow dung, wheat straw, and oak leaf litter were selected as the new media upon which the germination tests were run. The standard forest nursery soil, which is a sandy loam, was used as control.

Old cow dung and fresh wheat straw were collected from Qarga village near Sulaimaniyah. Year old oak leaf litter was gathered from Wellena village in Chuarta. The sandy loam control was brought from the local forest nursery, situated near the University. The pH value for the four media used in the experiment ranged between 6.65 and 6.80.

The seeds of native conifer trees, referred to as Zaweeta pine (*Pinus halepensis ssp. brutia*), were

obtained from the Qaliasan plantation on June 15, 1969. Their germination was over 80 percent.

On October 21, 1969, the seeds were sown at the rate of 50 seeds per pot, each pot being 25 cm. deep and 25 cm. in diameter at the top. The four variations were replicated four times for statistical analysis. The pots were kept covered with iron mesh as protection against damage by birds. The mesh was kept over the pots till the cotyledons were free from seedcoats.

After germination began, the established seedlings were counted every week. The number of surviving seedlings, stem length, and fresh green weight of seedlings were recorded on January 22, 1970.

Results and Discussion

The germination of pine seeds showed better results in the control than in the new germination media being tested. The percentage germination in the sandy loam was as high as 80 percent, which was also the reported viability of the seeds, while in the cow dung it was 55 percent, oak leaf litter 27 percent, and wheat straw only 17 percent (fig. 1).

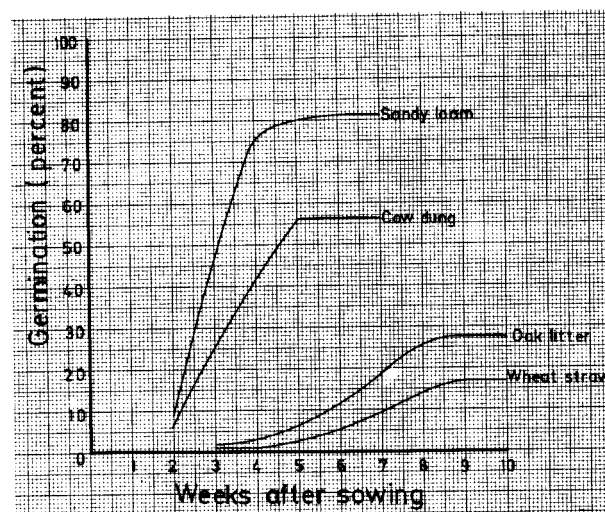


Figure 1.—Germination of Zaweeta pine seeds by different nursery media.

¹ Acting Dean of the College of Science and lecturer in the College of Agriculture, University of Sulaimaniyah, Iraq.

During the experiment, some clay particles accumulated in the cow dung, causing its surface to harden. This may have caused the decrease in total germination. The poor water holding capacity of wheat straw might have decreased the percentage germination of seeds in that media. Although the weather was getting cold, the germination percentages became higher with time, because of more decay and the increase in water holding capacity. It is doubtful that the poor water holding capacity of the wheat straw was the reason for the decrease in percentage germination, even though Bublitz (1953) proved this to be so with spruce needle medium, commonly used in Dunemann system seedbeds. Besides the poor water holding capacity of oak leaf litter, this media is rigid and flat, which may have prevented the penetration of radicles.

The rate of germination was the same in both the control and the cow dung media. Germination started 2 weeks after sowing and within 3 weeks reached its peak. For the oak leaf litter and wheat straw media, germination began 3 weeks after sowing. Furthermore, germination reached its peak in the oak leaf litter 5 weeks after germination began, and for a longer period in the wheat straw. Such delay in germination was of great importance for the slow developing forest tree seedlings.

Seedlings growth was best in the cow dung. The healthy green color and vigorous development were easily observed (fig. 2). To prove this fact statistically, the average stem lengths and the average fresh shoot weights were tabulated (table 1). While the increase in stem length was poor, the fresh shoot weight increased in cow dung very significantly. There was no significant difference in the survival of seedlings sown in cow dung and in the control. Both oak leaf litter and wheat straw showed negative results for stem length, fresh shoot weight, and survival.

Conclusion

Of the three germination media readily available in northern Iraq-cow dung, oak leaf litter, and wheat straw-cow dung best supported the growth

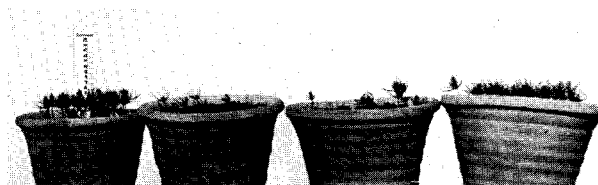


Figure 2.—Comparative growth of Zaweeta pine seedlings 4 months after sowing: *Left to right*, seedlings in cow dung, wheat straw, oak leaf litter, and sandy loam (control) media.

TABLE 1.—*Growth and survival of Zaweeta pine by different nursery media*

Media	Stem length (Cms.)	Fresh shoot weight (g/100 seedlings)	Survival (Percent)
Cow dung	3.5	34.3	100.0
Wheat straw	2.6	14.9	96.8
Oak leaf litter	2.9	19.4	92.5
Control	3.3	24.1	99.5

in Zawata pine seedlings. But there was not much difference in the rate of germination and survival. The percentage of germination in cow dung was 24 percent less than in the control; in oak leaf litter germination was about 28 percent, and in wheat straw about 17 percent.

Literature Cited

- Bublitz, W.
1953. Die Keimhemmende Wirkung der Fichtenstreu. *Naturwissenschaften* 40: 275-276.
- Dunemann, A.
1939. Saatbeet. Patentschrift. Nr. 678593.
- Gharib, M. S.
1965. Untersuchungen uber die Moeglichkeiten der chemischen Bodenentseuchung and guenstigen Saatmen gen in Nadelstreubeeten. Diss. Hann-Muenden.
- Selcuk, H.
1956. Biologische Grundlagen der Anzucht von Forstpflanzen in Nadelstreubeeten. Diss. Hann-Muenden.
- Wagner, H. G.
1958. Der Nachstoffumsatz in Nadelstreubeet. Diss. Hann Muenden.