

Determination of the optimal sowing time for
cotton seeds.

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Abbreviated Translation:

Two experiments were carried out to determine the influence of various temperature levels on the germination of cotton seeds.

Experiment 1 was designed to study in the laboratory the germination of seeds of 3 cotton varieties at 6 constant temperatures and under one combination of alternating temperatures (16 hours at 20°C and 8 hours at 30°C). Each temperature was tested on 3 replicates of 50 seeds each. Germination counts were made after 4 and 12 days. As "germinated" we counted only seeds that developed a vigorous main root with secondary rootlets and healthy cotyledons carried on a well-developed hypocotyl.

Results are presented in table I (averages of 3 replicates).

TABLE I. Percentage germination of cotton seeds at various temperatures

| Variety | 30°C | | 20°C | 15°C | 13.5+1°C | 10°C (°C) | |
|-----------------------|--------------------------|------|------|------|----------|-----------|---|
| | 20°C-30°C alternating | | | | | 5°C | |
| Acala 4-42 (delinted) | 87.7 | 92.5 | 91.2 | 84.0 | 78 | 7 | 0 |
| Acala 4-42 (linted) | 86.2 | 89.0 | 77.5 | 76.6 | 40 | 0 | 0 |
| Coker 100 | 76.2 | 84.2 | 78.0 | 69.5 | 70 | 4 | 0 |
| Louisiana 33 | 92.2 | 95.2 | 95.0 | 90.0 | 89 | 1 | 0 |

These data indicate that the percentage of germination diminishes with the temperature. There was a marked difference between linted and delinted seeds of Acala 4-42. The delinted seeds, which had also been disinfected, were much more tolerant of temperature drops than the linted seeds. The variety Louisiana 33 exceeds germination percentages of all other varieties tested at 13.5 + 1°C; the minimum temperature at which this and the other varieties tested will germinate lies between 10 and 12.5°C.

Experiment 2 aimed to determine in the field, how far the number of hours during which temperature falls below 20°C (as it frequently will in early spring sowings) affect the percentage of cotton seed germination.

Acala 4-42 seeds were sown in heavy soil on 3 dates, viz. 8.4.56, 17.4.56 and 26.4.56. 200 seeds were sown on each date. Table II presents the results.

TABLE II. Effect of soil temperatures on cotton seed germination.

| Date of sowing | Maximum temp. °C | Minimum temp. °C | Daily mean maximum | temp. °C minimum | No. of hours per day with temp. below | | % germination after 14 days |
|----------------|------------------|------------------|--------------------|------------------|---------------------------------------|-------------|-----------------------------|
| | | | | | 20°C | 15°C | |
| 8.4.56 | 31 | 10 | 24.8 | 14.7 | 16.4 | 5 | 74 |
| 17.4.56 | 31 | 10 | 27.6 | 17.0 | 10.3 | more than 1 | 84 |
| 26.4.56 | 30 | 10 | 26.7 | 16.5 | 9.8 | less than 1 | 86 |

Temperature difference between the second and third sowing were slight, but those between the first and last two sowings, were considerable. These differences are particularly marked in the number of hours with temperatures below 20°C. While about 10 hours of such lower temperature had no undesirable effect on germination, 16 hours per day below 20°C reduced percentage germination appreciably.