Soil Compaction Limits
Potato Stand Establishment
During Hot Weather

PLANTING A POTATO CROP during high
temperatures in July and August is a
hazardous undertaking in the San Joaquin Valley. Potato seed piece survival
seems to be dependent on favorable soil
and air temperatures. However, it is not
uncommon to find marked differences in
seed piece survival and stand of plantings
made between adjacent fields with similar
handling and climatic conditions.

Improved stands have sometimes re-
sulted from changes in methods of han-
dling potato seed pieces, including: plant-
ing deeper than normal in a cooler zone
of the soil; irrigating before and after
planting to cool the soil; and planting
during the cooler part of the night and
early morning. But improvements have
not been consistent at all planting sites.
In contrast, potato tubers remaining in
the soil from an earlier spring harvest
sprouted well after irrigation with no ap-
parent survival problem.

Two preliminary studies were made to
evaluate the possible effect of soil tem-
perature and changes in the physical con-
dition of the soil on potato seed piece
performance. White Rose seed pieces, well
suberized, were placed 20 to a flat, cov-
ered with vermiculite, and moistened.
Two flats were placed in each constant
temperature room at 41, 50, 59, 68, 77,
and 86°F. After two weeks in the dark it
was observed that all seed pieces were
sound and healthy.

Temperature effects
Marked differences in sprouting and
stem growth were noted with each 9-
degree increase in temperature. In a pre-
vious test, sprout development was inhib-
ited in seed pieces held at temperatures
above 90°F. Blackheart developed rap-

didly with eventual seed piece breakdown
above 95°F. At these high temperatures,
respiration of internal tissue apparently
utilized oxygen at a greater rate than was
possible for external oxygen to penetrate
the tissue. The change to anaerobic con-
ditions hastened the death of cells, and
soft rot organisms quickly attacked, with
resultant rapid decay of the seed piece.

Soil deterioration
In 1961 a planting of White Rose potato-
toes was made at the Agricultural Experi-
ment Station, U.C., Davis. The soil, Yolo
sandy loam, had been compacted in
early spring by driving heavy equipment
repeatedly over wet soil until an unde-
sirable structural change in the soil was
achieved. The three degrees of compac-
tion were rated severe, moderately severe,
and light.

Abnormally cool weather during late
July and August delayed planting until
relatively higher air temperatures re-
turned. White Rose seed pieces were ma-
cine planted and fertilized on September
12 at 3:00 p.m., at an air temperature of
94°F. The site was immediately furrow-
irrigated. Stand survival and plant vigor

Comparison of potato plant stands as affected by soil compaction and seed condition. Soil compaction: S—severe; M—moderately severe; L—light. Seed Planted as 1—cut, 2—whole tubers.
From the time of emergence until 34 days after planting, it was evident that soil compaction adversely affected survival and vigor of plants from cut seed more than whole seed. Gibberellic acid treatment did not enhance the survival of seed pieces, or stand. It had been previously found that hastening of sprouting and growth due to gibberellic acid is most pronounced with resting seed, or under cool growing conditions. Neither condition existed in this study. Soil temperature at seed piece depth remained below 90°F for the 34-day period of observation following irrigation.

These results suggest that potato seed pieces and plants can grow well at temperatures below 90°F, provided soil aeration is not limited by compaction. Although changes in seed piece handling may be made, the physical condition of the soil is also critical in obtaining a high percent of seed survival. The degree of soil compaction induced during harvest of previous crops may well affect the success of the potato plantings made in hot weather. Studies are being continued to evaluate changes in soil aeration due to alteration in the physical condition of soils and how potato seed survival may be improved with plantings made during hot weather.

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VACUUM STABILITY STUDIES OF IN-LINE MILK FILTERS

Vacuum stability tests on the new in-line milk filters now available to dairymen indicate that the filters will not reduce milking vacuum in barns with an adequate vacuum system. However, if the vacuum pump is unable to maintain a steady vacuum at the teat cup (less than 2-inch variation), the addition of an in-line filter would aggravate this deficiency.

The in-line milk filter was designed mainly as a management tool to help detect abnormal milk in pipeline milking systems and was not meant to replace the regular gravity filter. It also provides a measure of the thoroughness of the cow-washing operation. The transparent, plastic unit fits on the end of the milk hose at the milk valve. The replaceable filter pads are 4½ inches in diameter.

Since the milk hose serves the dual function of conveying milk and of applying a sub-atmospheric pressure to the teat orifice, any obstruction could upset the desired vacuum conditions in the teat cup, resulting in vacuum instability. Unstable vacuum is recognized to be a major cause of teat irritation.

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