Potato Growth Studies

Soil temperatures in Kern County potato fields average from 60°F to 70°F at 6” depth, with foliage cooling the soil about 8°F, and irrigation some 4°F.

Temperatures in potato beds were recorded at the 3”, 6” and 9” depths during the growing seasons of three years. Most of the temperature data were taken from the 6” depth, since the majority of tubers are found from 4” to 6” below the top of the ridge.

The potatoes were grown according to regular commercial methods. The land was irrigated prior to planting and then received no further irrigation until nearly the week of June 3. After that one series of beds received no further irrigation, while a second series received daily irrigations in alternate furrows. The most reliable data showing the true effect of irrigation were obtained from three to six or eight days after the last irrigation on the nonirrigated beds.

At this time, the soil surface was dry, although the plants had not begun to wilt severely. Wilting caused the vines to open up and exposed some of the soil to the sun. Comparable cooling was obtained for both the maximum and average daily temperatures. In every test the soil temperature at the 6” depth was cooler in the irrigated beds than in those not irrigated. The maximum amount of cooling observed in the area of tuber set was severely. Wilting caused the vines to open up and exposed some of the soil to the sun. Comparable cooling was obtained for both the maximum and average daily temperatures. In every test the soil temperature at the 6” depth was cooler in the irrigated beds than in those not irrigated. The maximum amount of cooling observed in the area of tuber set was

Foliage Cover and Shading

Average soil temperatures of fallow and of planted beds at the 6” depth were compared. Both series of beds received daily irrigations in alternate furrows. The plants emerged about March 15, and by April 15 were approximately 12” tall and 12” in diameter. By early May, the foliage covered the soil of the bed almost completely. Until the week of April 22, the soil temperature of the planted beds was only about 2°F cooler than that of the cropped beds, but from the first of May until harvest the planted beds were approximately 8°F cooler than the fallow beds. The small difference in temperature between the fallow and cropped plots during early April was probably caused by the fact that the foliage gave only partial shading to the soil. Later in the season, good foliage cover accounted for a cooling of nearly 8°F below that of bare soil.

Comparisons were made of planted beds, fallow beds, and fallow beds artificially shaded. This third group was shielded completely from the sun with a large piece of plywood placed about 12” above the top of the ridge and so mounted that air moved freely underneath.

After the first of May, the planted plots averaged 6°F to 8°F less than that of the fallow plots. The artificially shaded beds averaged 2°F to 4°F cooler than the planted beds.

Effect of Irrigation

The effect of furrow irrigation on cooling of the soil was tested in planted beds. Beds with comparable foliage cover were irrigated until the day the test began. After that one series of beds received no further irrigation, while a second series received daily irrigations in alternate furrows. The most reliable data showing the true effect of irrigation were obtained from three to six or eight days after the last irrigation on the nonirrigated beds.
of certificates are lost and that frequently
the wrong certificates are returned for
payment. To avoid delay, confusion and
unnecessary expense, book credits are be-
ing used. A statement is mailed to each
member showing changes in his account
during the year, and its status at the
year’s end adequately serves the purpose
of a certificate.

Intermember Adjustments

There are several plans by which west-
ern associations transfer investments
from members in need of money to those
with money to invest. One such plan has
been in operation for over 20 years. These
plans are a step in the direction of mak-
ing revolving finance more popular
among farmers, particularly those who
are getting started in the business
of farming and are short of capital.

Giving revolving fund credits negoti-
ability touches two other problems. One
concerns the extent to which an associa-
tion considers revolving fund finance as
security when it extends credit to mem-
ers. Obviously, any association which
extends credit to its members must protect
itself in any plan to transfer revolving
fund credits. For example, the bylaws
may give the association a prior lien on
all revolving funds to cover any indebted-
ness of the members.

A second point concerns the matter of
paying interest. Revolving fund credits
bearing approximately current interest
rates are likely to be salable at something
like par. In cases where no plan has been
worked out to facilitate such transfers,
needy members must sometimes assign
accounts at heavy discounts.

Risk Aspects

Co-operatives face many of the same
risks as other types of business. Associa-
tions which derive their revolving capital
from stated percentage deductions from
proceeds may find themselves short of
funds in years of low prices. On the other
hand, a flat deduction—say 1¢ per dozen
eggs—may seem burdensome to produc-
ers with eggs at 20¢ a dozen, equivalent
to 5%, but be negligible with prices at
75¢, equivalent to ¾ of 1%. Associations
which revolve capital out of savings will
find that savings vary from year to year.
Decreased savings may require such
lengthening of revolving periods as to
cause trouble under fixed maturity plans.

Another sort of risk concerns equities
after violent price level changes, particu-
larly in case of dissolution and liquida-
tion when articles and bylaws have not
been carefully drawn. In times of signifi-
cant inflation some well-established co-
operatives could pay off all revolving
funds and have a large amount of money
left. Bylaws could allot such a residual
to the stockholders in case of liquidation
and not to those who contributed most
of it.

Co-operatives, like other businesses, set
up reserves for numerous purposes. Re-
cently there has been a tendency to set
these up as revolving funds. Some of these
so-called reserves are more in the nature
of risk capital and should perhaps be so
referred. In that case they might be re-
volted, perhaps on a book value basis.

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ORANGE

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over the 22 years of the experiment was
detrimental to the structure of the soil,
causing a marked deterioration of tree
tooification and yields. However, when
these fertilizers were used with manure in
such a manner that the manure sup-
plied one half of the nitrogen, harmful
effects did not occur and the yields were
not depressed. When soil conditions are
such that the continuous use of these fer-
tilizers is harmful, organic matter sup-
plements appear to be particularly de-
sirable.

In these treatments dairy or steer man-
ure from fattening yards was used. Other
treatments with manure, alfalfa hay,
cereal straw or lima bean straw indicate
that these have equally good effects on
yields if equal quantities of organic mat-
ter are applied and their use is supple-
mented with nitrogen fertilizers to reach
the same total quantity of nitrogen. The
most important consideration in the use
of different bulky sources of organic mat-
ter appears to be the ratio of the amount
of organic matter to the amount of nitro-
gen—from all sources—applied annually.
In the most productive treatments this
ratio has been close to 20 to one. This
is equivalent to a carbon-nitrogen ratio
of about 10 to one.

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The above progress report is based on Re-
search Project No. 1175.

FRUIT SIZE AND GRADE

The use of covercrops—with chemical
sources of nitrogen—caused a small in-
crease in the size of the fruit. Larger in-
creases resulted from the use of manure.

The effects of organic matter from
covercrops and manure on fruit size ap-
pear to be due to two factors. One is their
beneficial effect on soil structure and the
infiltration of water; the other is the ef-
flect of applied organic matter upon the
supply of potassium which affects fruit
size.

The grade of the fruit was not appreci-
ably affected by the growing of cover-
crops or the use of manure. However,
these factors slightly affected the internal
quality of the fruit. In general, manure
appeared to act very much like a potash
fertilizer and made the juice slightly more
acid.

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The above progress report is a summary
of part of the results of a long-term experiment
at the Citrus Experiment Station at Riverside.
The full report is available as Bulletin 722 of the
California Agricultural Experiment Station.

POTATO

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about 6° F, the average 4° F. This was
true early in April when the foliage gave
only partial cover to the bed, as well as
in late May when the foliage almost com-
tpletely shadened the ground.

Records were obtained from irrigated
and nonirrigated fallow beds. Water was
first applied to the irrigated beds on April
17, after which they received daily irriga-
tions in alternate furrows. Temperatures
obtained at the 6" depth show that, dur-
ing late April, soil of the irrigated bed
was on the average approximately 2° F
cooler than that of the nonirrigated beds.
During May, the difference was approxi-
mately 3° F, and near the end of the test,
in June, the irrigated beds were approxi-
mately 4° F cooler. It appeared that the
higher the air temperature the greater
was the degree of cooling of the soil by
irrigation. It would seem that growers
planting potatoes in this soil at the 6" depth
during periods of high temperature
might expect a cooling of approximately
4° F, or possibly slightly more, in irrig-
gated as contrasted with a dry soil.

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The above progress report is based on Re-
search Project No. 1175.

CARTONS

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April 2, a premium has been paid for the
new box over the old, often amounting
to 25¢ per standard box.

Retail markets gain from the one-half
box carton. Many stores find the old box
uneconomical because of its size, decay
and shrinkage become serious before all
the fruit is sold. The new boxes are lighter
to handle and, when empty, can be used
as consumer tote box.

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