Year-round production of potatoes in California frequently necessitates the use of resting tubers as planting stock. However, resting tubers normally do not sprout for 1–4 months after harvest—depending on varietal characteristics—despite exposure to optimal environmental conditions.

Investigations on the effects of gibberellin on sprouting of resting potatoes and on the resulting plant growth were initiated with a preliminary laboratory experiment wherein match sticks—previously soaked in gibberellin and inserted into resting potatoes—hastened sprouting by four weeks.

In subsequent investigations White Rose and Russet Burbank tubers were immersed in solutions containing no gibberellin—the control—and 25, 50, 500, or 2,000 ppm—parts per million—of gibberellin. After immersion the tubers were held in open flats at controlled temperatures of 50°, 59°, or 77°F. Under these conditions gibberellin accelerated sprouting by 2–3 weeks. Sprouts appeared at almost all eyes of tubers dipped in the 25, 50, or 500 ppm solutions, indicating that apical dominance was reduced. However, tubers immersed in a solution containing 2,000 ppm of gibberellin sprouted only at an apical eye. Root development at the base of new sprouts was delayed four months on tubers which were previously dipped in a solution containing 500 ppm of gibberellin.

In other experiments it was found that the duration of immersion—five minutes, 1½ hours, or six hours—did not significantly influence the rate or nature of sprouting.

In field studies, tuber dip treatments resulted in an even more pronounced stimulation of sprouting than had been observed previously under controlled laboratory conditions. However, in early field experiments concentrations as low as 10 ppm were found to be detrimental to plant growth and subsequent tuber development. These responses were characterized by severe yellowing and rolling of the early developing leaves, spindly growth of stems, increased numbers of stems per hill, and misshapen tubers appended to elongated underground stems. This was especially evident in a replicated field experiment at Shafter, where tubers dipped in 10 or 100 ppm yielded characteristically undesirable plants and tubers. The resulting yield of tubers was reduced but the number of tubers per hill was increased. The undesirable foliar effects were also observed at Davis where tuber samples from these treatments were sprouted in pots.

Appearance of plants from seedpieces, which were dipped—from left to right—in 0, 10, or 100 ppm of gibberellin. Although emergence was accelerated, excessive elongation of above and below ground stems, multiple sprouting and inhibition of leaf growth resulted from the higher concentrations.
Further experiments in the field demonstrated that lower concentrations—0.5-5.0 ppm—were effective in curtailing the rest period without causing any important leaf modification. However, some elongation of underground stems occurred. The promotion of sprouting and subsequent plant growth from freshly harvested White Rose potato tubers treated with 0, 1, 5, and 25 ppm of gibberellin and then grown in the field are shown in the lower graph on this page. The rate of sprouting was comparable in Pontiac, Kennebec, and Russet Burbank potato varieties.

The possibility that gibberellin might overcome chemical dormancy induced by maleic hydrazide—MH-40—was investigated with White Rose and Russet Burbank potatoes. Thirty tubers of each variety from plants sprayed in the field, four weeks before harvest—with a solution containing 6,000 ppm of maleic hydrazide were held at 50°F for three months without producing visible sprouts. The tubers were dipped for five minutes in water or in a solution containing 500 ppm of gibberellin, then planted in a soil bench in a greenhouse controlled at 65°-70°F. Six weeks later only three tubers from plants which received maleic hydrazide sprays had sprouted irrespective of treatment with gibberellin.

The effects of gibberellin on sprout growth of potatoes from plants treated with lower concentrations of maleic hydrazide bear further investigation.

The effectiveness of preharvest foliar sprays of gibberellin in shortening the rest period of the immature, growing tubers was investigated with a spring crop of White Rose potato plants. Plants were sprayed to run-off four weeks, two weeks, or one week before harvest with solutions containing 0, 10, 50, 100, and 500 ppm of gibberellin. The tubers were harvested 111 days after planting. Experiments continued on page 14.

The percentage of White Rose potatoes sprouted at 59°F as influenced by a five-minute dip in solutions containing 0, 50, 500, or 2,000 ppm of gibberellin.

Appearance of tubers from plants which received foliar sprays of gibberellin four weeks before harvest. Left to right: 0, 10, 50, 100, and 500 ppm. Notice the sprouting and subsequent tuber growth on tubers from the higher spray concentrations.

Appearance of White Rose potatoes eight weeks after they were immersed in solutions containing—from left to right—0, 50, 500, or 2,000 ppm of gibberellin. Stored at 59°F. Notice the branched habit and the greater number of sprouts in the 50 as compared with the 2,000 ppm treatment.

Percentage of tubers sprouted after freshly harvested White Rose potato seedpieces were dipped in solutions containing 0, 1, 5, or 25 ppm of gibberellin and planted on August 9, 1957, in a replicated field trial at Davis. Comparable emergence resulted in the Russet Burbank, Kennebec, and Pontiac varieties.
CREDIT
Continued from preceding page
offered any kind of credit, none, with
one exception, offered full credit. The
exception was in Fresno where 86% of
the stores with 7–14 employees which
offered credit had full credit.
To be continued

Marilyn Dunsing is Assistant Professor of
Home Economics, University of California,
Davis.

Jessie V. Coles is Professor of Family Eco-
nomics, University of California, Berkeley.

PARITY
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be gained from such regulation. The
parity standard is intended to define
prices that are fair to producers and
consumers.

However, the argument has been ad-
vanced that the present parity index is
unrepresentative of production and cost
conditions for specialty crops and a more
representative index would give greater
weight to wages of hired labor and per-
haps certain other inputs which bulk rela-
tively large in specialty crop-production
cost. Since the wages subindex stands at
a higher level than any other, any in-
crease of its weight will raise the over-all
parity index. The amount of the increase
would depend upon how offsetting de-
creases of weight are distributed among
the other subindexes.

While certain types of special-purpose
revision of the parity index for specialty
crops could result in parity-price in-
creases of perhaps 10%–20%, the pros-
tects of obtaining such revision are re-
more. The contention that revision should
be made appears to rest on the premise
that the parity index should accurately
represent production expenses of indi-
vidual commodities or groups of com-
modities. A cost-of-production parity in-
dex would logically have to take into ac-
count increases in cost as a result of
increasing efficiency which might offset
increases from other modifications.

A market control program that is ef-
fective in smoothing out short-run price
fluctuations about a basic price level or
in preventing disastrously low prices in
unusual seasons may benefit both pro-
ducers and consumers. It can stand with-
out recourse either to the parity goal or
the parity limitation. Prudently admin-
istered, with proper attention to con-
sumer interests on the one hand and
long-run supply responses on the other,
marketing orders might conceivably
function better without objective stand-
ards of any kind. But it is hardly conceiv-
able that consumer safeguards could or
should be eliminated from the law. De-
spite the deficiencies of the parity stand-
ard, it is better than none. Any proposal
to eliminate the parity limitation, there-
fore, might reasonably be accompanied
by a proposal for a substitute standard.

A bill under Congressional examina-
tion would provide, in the interest of
producers and consumers, an orderly
flow or disposition thereof to and among
the available market outlets throughout
the normal marketing season to avoid
unreasonable fluctuations in supplies and
prices.

Passage of this or a similar amend-
ment which does not mention parity,
would complete the process of steriliz-
ing the parity limitation by providing an
alternative and more flexible set of cri-
teria. Nevertheless, administrative stand-
ards would still be required to replace
the legislative parity standard.

H. Ray Woltman is Associate Specialist in
Agricultural Economics, University of Califor-
nia, Berkeley.

POTATOES
Continued from page 5
amination of the tubers at harvest re-
vealed that gibberellin applied to the
foliage as late as one week before harvest
markedly stimulated sprouting. In com-
parison, tubers from untreated plants
showed little or no sprouting activity.

When the tubers harvested from
sprayed plants were cut and planted as
seedpieces, the rate of emergence of new
plants was accelerated. Most rapid emer-
gence resulted from the earliest appli-
cation and the highest concentration.
Similar results were obtained with a
summer crop of White Rose potatoes at
Davis. Although foliar sprays are rea-
sonably effective in shortening the rest
period, high concentrations of gibberelin
are required and therefore the method
probably has limited practical value.

Immersing resting potatoes for five
minutes in a gibberelin solution—from
0.5 to 25.0 ppm—will consistently cur-
tail the rest period and promote sprout
growth. However, the commercial signi-
ficance of these findings must be de-
determined.

The influence of gibberellin on yield
and on the processing quality of the re-
sulting tubers is being investigated under
a variety of environmental conditions
and locations. The effect of the chemical
on sprout emergence and plant growth
from nonresting potatoes needs to be in-
vestigated.

Lawrence Rappaport is Junior Olericulturist
in Vegetable Crops, University of California,
Davis.

Herman Timm is Junior Olericulturist in
Vegetable Crops, University of California,
Davis.

Laverne F. Lippert is Research Assistant in
Vegetable Crops, University of California,
Davis.