FINAL RESEARCH REPORT ON 1988
POTATO-HERBICIDE INJURY STUDY

SUBMITTED TO SLV RESEARCH CENTER COMMITTEE AND THE AREA II POTATO ADMINISTRATIVE COMMITTEE

PROJECT LEADER: **RESEARCH CONDUCTED BY CSU WEED SCIENCE PROGRAM**
PHILIP WESTRA, PH.D - LEADER, GARY FRANC, PH.D
TIM D'AMATO, RES. ASSOC.

TITLE: **FOLIAR AND TUBER INJURY SYMPTOMOLOGY FOLLOWING MISSAPPLICATIONS OF ALS INHIBITING HERBICIDES TO POTATOES.**

PROJECT JUSTIFICATION: Confirmed cases of OUST herbicide injury to potatoes in 1987 in the San Luis Valley prompted this research which was designed to document foliar and tuber injury caused by foliar applications of oust, harmony extra, assert, amber, glean, and ally herbicides. Oust was the only non-crop land herbicide used in this study. Harmony extra and assert were included because of their barley marketing potential in the valley; this research simulated drift or misapplication of these two products. Glean and amber were included to broaden our understanding of sulfonylurea herbicide effects on potatoes. Russett burbank and centennial russett potatoes were evaluated in this study because of their market dominance and importance in the valley.

PROJECT STATUS. Research funded for 1988 has been completed. Final evaluation of the longer term effects of these herbicides in the soil could be accomplished by a portion of the 1989 funding request which would cover the planting of barley and russett burbank and centennial russett potatoes into all 1988 research plots.

SIGNIFICANT ACCOMPLISHMENTS FOR 1988:

SUMMARY CONCLUSIONS 1. In general, the July 1 application of herbicides during tuber initiation was more damaging to yield and tuber quality than the July 14 application during tuber bulking phase.

2. Oust damage symptomology to russett burbank tubers shifted dramatically from the July 1 application to the July 14 application. The early application caused folded, knobby, popcorn tuber symptomology with very few tuber cracks evident, and the proliferation of many small tubers. The late application symptomology was predominantly tuber cracking.

3. The order of increasing severity of injury to potatoes in this study was:

UT. CHECK < ALLY < GLEAN < AMBER < HARMONY EXTRA < ASSERT < OUST

4. Tuber symptoms and tuber damage were more obvious and more severe than foliar symptoms or foliar damage following application of these herbicides.

5. In light of the perceived weakness of the sulfonylurea herbicides on plants in the Solanaceae or nightshade family, the severity of oust

damage to potatoes (a member of the nightshade family) was somewhat surprising.

6. Oust, even at the lowest rate tested, was extremely damaging to potato tubers. Its level of tuber damage was several orders of magnitude greater than the other sulfonylurea herbicides tested. The effects of oust on tuber size and tuber quality virtually eliminated the production of any marketable tubers. Oust and growing potatoes are an extremely bad mix. This indicates that under no circumstances should oust be allowed to contaminate environments where potatoes are grown.

7. Assert, either drifting or at field label rates, should never come into contact with the foliage of growing potatoes as it causes totally unacceptable tuber cracking which results in non-marketable tubers. Assert primarily caused tuber cracking.

8. Harmony extra, either drifting or at field labeled rates, should never come into contact with the foliage of growing potatoes as it causes totally unacceptable tuber folding which results in non-marketable tubers. Harmony extra primarily caused folded tubers.

9. Small amounts of ally, glean, or amber drifting onto growing potatoes likely would cause slight to minimal potato tuber injury. Of these three, ally and glean would cause the least injury.

10. The russett burbank variety was more sensitive to the herbicides in general, and specifically to oust, than the centennial russett variety. If potatoes had to be planted back into oust contaminated soil, the use of russett burbank potatoes would be a poor choice; use of centennial russett would be the preferred choice.

11. Although some of the herbicides significantly reduced tuber yields, a more objectionable aspect was the effects of some of these herbicides on potato tuber quality; some herbicides produced tubers which were totally non-marketable.

12. This research suggests that some of these herbicides, and especially oust, may adversely affect potato tubers at very low concentrations. This raises the possibility of herbicides such as oust being able to adversely affect potato tuber growth at concentrations below current analytical detection limits. This interaction of potatoes with herbicides which have biological activity at extremely low concentrations warrants further research.

FUNDING: 1988 ALLOCATION $ 5,000

1989 BUDGET REQUEST FOR 3 STUDIES

HOURLY LABOR	5000.00
SUPPLIES	500.
TRAVEL	2000.00
TOTAL 1989 REQUEST	7500.00