PROPOSAL FOR 1989 WEED SCIENCE-POTATO RESEARCH IN THE SAN LUIS VALLEY

TITLE: Effects of preplant ultra-low levels of Oust, Harmony Extra, and Assert on tuber development of Russett Burbank, Centennial Russett, Norkota Russett, and Sangre potatoes.

SUBMITTED BY: Philip Westra, Weed Scientist
Dept. Plant Pathology/Weed Science
Colorado State University
Ft. Collins, CO 80523
303-491-5219

FUNDING TIMETABLE: April 15, 1989 - Dec. 31, 1989

AMOUNT REQUESTED: $ 7,500

PROPOSED STUDIES:

STUDY 1: Oust will be applied preplant at 0, 2, 5, 10, 20, 50, 100, 200, and 500 parts per trillion to the soil surface, and rototilled in to a uniform 4 - 6 inch depth. The soil will be hilled up, and planted with Russett Burbank, Centennial Russett, Norkota Russett, and Sangre potatoes in each plot. Harmony Extra and Assert will be included in the study at 0, 10, 20, 50, 50, 100, 200, and 500 parts per trillion. The study will be replicated 3 times, and taken to final yield. Full photographic, yield, foliar damage, and tuber damage documentation will be taken for all three potato varieties.

STUDY 2: Tubers from the 1988 SLV herbicide injury study have been saved as seed stock. Tubers of Russett Burbank and Centennial Russett potatoes taken from 1988 Untreated, Oust, Harmony Extra, and Assert treated plots will be planted in the SLV. Number of shoots per hill, seedling vigor, yield, and progeny tuber quality will be measured. A full photographic record of the herbicides effects on second generation progeny will be made. This study will have 3 replications, and taken to final yield.

STUDY 3: The research plot area from the 1988 study presumably has residual levels of each herbicide present in the soil. This area will be restaked, rototilled plot by plot, and planted in the following fashion. The first three feet and the last three feet of each 14 foot long plot will be planted to a malting barley variety commonly used in the San Luis Valley. The remaining central 8 feet will be hand planted to russett burbank and centennial russett potatoes to evaluate potato injury from residual levels of oust, assert, harmony extra, amber, glean, and ally remaining in the soil from the 1988 study. All potatoes will be taken to maturity and evaluated for foliar and tuber injury as carried out in the 1988 research.

JUSTIFICATION:

Oust contamination of San Luis Valley potato production fields in 1987 has had a serious, long term effect on the potato industry in the valley. Research conducted in 1988 by our weed science research group in the San Luis Valley with sulfonylurea herbicides and Assert showed that these herbicides differed significantly in the damage caused to developing potato tubers. When applied to the foliage of Russett Burbank or Centennial Russet potatoes, several of these herbicides caused such extensive tuber damage that very few tubers were of marketable quality. In general, Russett Burbank tubers were more sensitive to herbicide injury than Centennial Russett tubers. At levels as low as approximately 2-4 parts per billion, Oust and Harmony Extra caused significantly more tuber damage than did Glean, Ally, or Amber. Since Oust is normally applied to right-of-ways at approximately 125 parts per billion, our research showed that a very small proportion of applied Oust drifting onto potato fields can cause almost total loss of marketable tubers. Assert applied at a commercial rate of 0.47 lb ai/A caused damage almost as severe as that caused by Oust. It should be emphasized that Oust was applied at very low rates, while Assert reflected a full field rate. What is evident, however, is that several of these herbicides will be targeted for small grain production use in the San Luis Valley. Information on the effects of these herbicides on potatoes is important to all involved in San Luis Valley weed control.

Although our 1989 research documented the effects of Oust contamination similar to what likely happened in some fields that were contaminated in 1987, our research did not address the effects on potato tubers caused by pre-existing, ultra low Oust levels in the soil. Farmers dealing with confirmed Oust contaminated fields, and the Colorado seed potato certification program, are faced with the nagging question of what production and tuber effects, if any, are caused by low levels of Oust occurring in potato production fields. Are potato yields suppressed by such levels? Are the progeny of tubers harvested from such fields normal? Are normal appearing tubers harvested from such fields suitable for seed stock? What is the lowest soil Oust level for a zero effect on potato tubers? Our proposed 1989 research would address these issues, and attempt to define the effects of chronic, low levels of Oust in soil.

PROPOSED 1989 BUDGET

HOURLY LABOR	$ 5000.00
SUPPLIES	500.00
TRAVEL	2000.00
TOTAL 1989 REQUEST	7500.00