RESEARCH PROPOSAL FOR 1995

Submitted to:

SLV Research Center Committee
and the
Colorado Potato Administrative Committee (Area II)

TITLE: Cultural and Physiological Studies

PROJECT LEADER: Asunta (Susie) Thompson-Johns

PROJECT JUSTIFICATION:

Providing seed producers and commercial potato farmers information relating to fertility requirements, water usage, plant spacing, disease and pest control, and storage management can result in a more positive experience when growing a new variety or advanced breeding selection. Thus, development of management profiles can mean success or failure of a new release.
In an effort to develop management strategies for new varieties at time of their release, studies investigating the parameters of plant spacing, petiole nitrate levels, and storage regimen, are proposed.

Shatter bruise and blackspot bruise reduce quality of a potato crop and can affect storage and end use. Shatter bruises are not only unattractive, but can provide an entrance for disease organisms such as *Fusarium sambucinum* and *coeruleum* (dry rot)and early blight (*Alternaria solani*) which can develop during the storage of seed or commercial potatoes. Screening breeding selections for susceptibility to bruising can detect clones which may pose a problem for growers, as well as identify germplasm resistant to bruising for further crossing and germplasm development.

Most varieties of *Solanum tuberosum* L. are susceptible to stress induced by limited water supplies, as well as high and low temperatures. Although producers are able to manage water requirements fairly successfully, better understanding the changes at the cellular level of stressed tubers could provide incite into how to manage the crop in storage for specific end uses and provide commercial and seed potato growers more options for economical success. This information would also be valuable to potato breeders in their quest to develop superior varieties for use by the potato industry.

Information regarding cultural management practices and physiology of the potato can provide potato growers the opportunity to have a more successful experience with a new variety and provide a larger economic return on varieties they are producing. The knowledge gained from studies contained in this project can also augment the breeding program and provide information for germplasm enhancement.

PROJECT STATUS: New

SIGNIFICANT ACCOMPLISHMENTS FOR 1994: Not Applicable

OBJECTIVES FOR 1995:

1. Begin development of management profiles for new potato cultivars and advanced selections. Focusing on:
    a. Seed piece spacing
    b. Petiole nitrate profiles
    c. Storage regimes

2. Evaluation of potato clones for resistance/susceptibility to shatter bruise.

3. Evaluation of germplasm for resistance/susceptibility to blackspot bruise.

4. Screening potato breeding selections for resistance/susceptibility to tuber early blight development.

5. Investigation of tissue changes and degradation at the cellular level of genotypes susceptible to water and temperature stress.

6. Determination of the contribution of the mother tuber (seed piece) on yield and grade of commercial and seed potato production.

FUNDING REQUESTED:

1994 Allocation: Not Applicable

1995 Requested:

Construct Shatter Bruise Chamber	$150.00
Abrasive Peeler	800.00
Temporary Help	3,000.00
Grand Total	$3,950.00