

1989-90 RESEARCH PROPOSAL  
Presented to  
Area II Potato Administrative Committee

TITLE: POTATO GROWTH ANALYSIS UNDER FIELD CONDITIONS

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DEPARTMENT: Horticulture

PROJECT STATUS: New

PROJECT JUSTIFICATION: Plant Growth Analysis is a research strategy designed to provide an in-depth look at how any given potato variety reacts to its field environment. The research methods include weekly measurements of a wide range of key growth characteristics which create a data base that permits the researcher to "fit" a mathematical model and thereby identify the unique ways each potato variety develops top and tuber growth. Each variety has its own, genetically controlled response patterns, modified by the environment, that result in the variety either being adapted or unsuited for commercial production in any given area. The results of growth analysis studies could have practical value to many phases of potato production including seed handling and planting, fertility and plant nutrition, irrigation scheduling, pest control, vine killing, and harvesting. Ultimately maturation of tubers and changes in the cultivar's growth priorities could be predicted. Plant growth analysis studies should help us better understand why some cultural practices "work", others don't, and even more important, identify needed research.

Learning how to grow new varieties is usually a time-consuming, and often costly effort. If we could gain enough experience from growth analysis research under San Luis Valley conditions, it is entirely possible that essential information regarding a new variety could be supplied to growers at the time the variety is released.

OBJECTIVES FOR 1989-90: The research methods used in field growth analysis are generally established. However, each field situation has unique characteristics that need to be taken into consideration. Specialized or unique lab equipment is not required. Large amounts of data are involved; thus computerized methods are essential.

1. Conduct growth analysis studies on five potato varieties: Centennial, Russet Burbank, Sangre, Russet Nugget, and Russet Norkotah. Data will be collected at approximately weekly intervals from emergence through vine kill.
2. Carefully evaluate existing plant growth analysis methodology to hopefully arrive at the most efficient way to conduct such research. A computerized "electronic" notebook will be available for the 1989 study --- this device will permit direct data entry into a computer and

eliminate time-consuming hand recording. Other aspects of research will also be evaluated.

3. Key environmental measurements, solar radiation and max/min temperatures will be recorded on a daily basis to enable us to use "physiological" time to predict growth.

FUNDING REQUEST:

Labor: \$2,500 — Area II Funds

Input from other sources:

1. travel \$500
2. misc. supplies \$300
3. computer time and software donated from Colorado State University
4. computerized "electronic notebook" available through Dr. Moore.