

## Moisture regimes and relay cropping studies in spring potato (*Solanum tuberosum* L.) under mid hill conditions of Himachal Pradesh

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### ABSTRACT

A field experiment was conducted for two years during spring season at the research farm of CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur to study the influence of different moisture regimes on growth and yield of potato and explore the possibility of growing relay crops in spring potato (*Solanum tuberosum* L.) Mulching with pine needles significantly increased tuber yield, growth and yield attributes. Optimum moisture regime (irrigation at IW / CPE ratio of 1.0) resulted in significantly higher tuber yield, growth and yield attributes. Rajmash was grown successfully as relay crop in spring potato resulting in significantly higher potato equivalent yield and net returns.

**Key words :** Potato, Moisture regimes, Relay/inter cropping.

### INTRODUCTION

Potato occupies an important place in the economy of Himachal Pradesh. Because of favorable environmental conditions, State enjoys natural advantages in respect of potato production. Potato is quite exacting in its input requirements which must be met for the full realization of its potentialities. One such input is water and main reason for low yield of spring potato in Himachal Pradesh is lack of proper scheduling of irrigation and poor water management practices. Sprouting in potato can initiate and progress even in dry soils on account of high water content, but emergence of sprouts above ground is delayed in such conditions. Excess soil moisture is equally harmful as it lowers the soil aeration and may also favour certain diseases and pests. Recently, the climatological approach is considered the most reliable device in which scheduling of irrigation is based on cumulative pan evaporation (Sharma and Dixit, 1992).

The spring crop is also exposed to very low temperature in the early stages before emergence and to high temperatures during tuber development. Mulching have been reported to moderate soil temperature and conserve moisture in the soil, thereby helping in reducing the adverse effects of low and high temperatures and improving the yield (Jaiswal, 1995). Spring season is good for short duration pulses and can be beneficial in increasing the income by growing them as intercrop/relay crops in spring potato. Intercropping of Rajmash with potato has been successfully demonstrated by Massod and Kushwaha (1987). Keeping in view these factors the present investigation was carried out to work out suitable moisture regime/irrigation schedule and intercrop/relay

crop for spring potato under mid hill conditions of Himachal Pradesh.

### MATERIALS AND METHODS

The experiment was conducted during the spring seasons for two years at the experimental farm of CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur situated 32.6° N and 76.3° E at an elevation of 1291.0 m above mean sea level which falls in the mid-hill zone of the Shiwalik ranges of Himachal Pradesh. The soil of the experimental site was silty clay loam in texture and acidic in reaction (pH 5.8) having 0.64% organic carbon, medium in available nitrogen (385.6 kg/ha), phosphorus (14.1 kg/ha) and potash (228.1 kg/ha). The experiment with ten treatments comprising of one control (without irrigation, mulch and relay crop) and nine combinations of three moisture regimes [ $M_0$  - Rainfed with mulch of pine needles @ 10 t/ha,  $M_1$  - Sub optimum (irrigation at IW / CPE ratio of 0.5),  $M_2$  - Optimum (irrigation at IW / CPE ratio of 1.0)] and three relay crops [ $C_1$  - Rajmash (*Phaseolus vulgaris*),  $C_2$  - Moong (*Vigna radiata*),  $C_3$  - Cowpea (*Vigna unguiculata*)] was laid out in randomized block design with three replications. IW (irrigation water) of 5.0 cm depth at one time was applied by calculating flow of water through regulated surface channel flow against time by furrow method and CPE (cumulative pan evaporation) was recorded with USDA open pan evaporimeter. Mulch was applied immediately after the planting of potato and partially rolled but replaced just after the earthing up and sowing of relay crops. Kufri Jyoti variety of potato was planted on January 2 and 22 during two years of experimentation. Potato was planted

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