

## Physiological Aspects of Crop Productivity at Leh - Learning's from Hot Arid Region

Uday Burman\*

ICAR-Central Arid Zone Research Institute, Jodhpur 342 003, India

**Abstract:** Scientific laboratories and agricultural research stations in cold arid region of our country especially around Leh are still in infancy. Additionally, there are meagre reports on the understanding of different interventions that may have some potential to realize high agricultural yields in cold region. Therefore, initially we need to rely on results from hot arid regions. However, in order to enhance the probability of success, commonality between the two regions with emphasis on crop response at physiological plane, need to be thoroughly understood. This should be the basis of suggesting interventions that may be adopted as such or after fine tuning keeping in view the agricultural policy of the region and in consultation with the local farmers. Crop plants in the Indian cold arid region experiences both low temperature and water stress. Many agro-techniques related to genotype and fertility management along with use of growth regulators have been successfully adopted in hot arid region. The present article discusses some of these that may have relevance in cold arid region too. However, it is imperative to mention here that before suggesting blanket recommendations it shall be appropriate to arrive at a consensus decision after active participation of local farmers, agricultural scientists and policy makers so as to develop a holistic approach for the complete development of agriculture at Leh.

**Key words:** Arid, genotypes, fertility, management, plant physiology, low temperature, water stress.

### The Arid Tract

India's arid zone is the most densely populated desert in the world. The area is about 59.2 Mha, which includes about 7.03 Mha of cold desert in Ladakh and Lahaul valleys. There are large tracts in north-western India and the interior peninsula that experience hot arid conditions also. Our area of interest in the present article i.e. the Indian arid zone is depicted in Fig. 1.

Aridity is a term that most people conceptually understand, and it evokes images of dry, desert lands with sparse natural surface-water bodies and rainfall, and commonly only scant vegetation, which is adapted to scarcity of water. Aridity has a wide variety of landscape manifestations including barren rock hills and plains, sand dune fields. It also occurs in regions with cold climates in which precipitation falls mainly as snow.

Soils at high altitude cold desert are coarse textured, permeable, deserted, and having poor water and nutrient holding capacity. Also, soil micro flora population is sparse due to poor soil structure, texture, very high sand and clay,

low biological activity and freezing during long winter period in this region (Charan *et al.*, 2013).

A commonality can be drawn between the cold and hot arid region as depicted in Table 1 that lists important climatic and edaphic factors known to influence land productivity.

### Issues at Leh

At Leh the situation of water scarcity is further aggravated by, degradation and overexploitation of valuable groundwater

*Table 1. Weather and soil characteristics of Leh and Jodhpur*

Parameters	Leh	Jodhpur
T min	-15.21 to 12.34°C	2.82°C
Tmax	-3.95 to 27.31°C	48.9°C
Av Rainfall	90 mm	360mm
Clay (%)	10.96-12.53	7.1
Sand (%)	52.4-69.99	87.2
Silt (%)	19.04-35.08	5.6
BD (g/cm <sup>3</sup> )	1.38-1.44	1.51
pH	8.21-8.44	8.1
Texture	Sandy loam	Sandy loam
Reference	Charan <i>et al.</i> , 2013	CAZRI pub.

\*E-mail: burmanuday821@gmail.com