BIOSALINITY NEWS

RESEARCH UPDATES

BARLEY: A SALT TOLERANT CEREAL CROP

Long and stiff barley awns fend off birds and insects

A barley field experiment at ICBA

Barley (*Hordeum vulgare L.*) is the fourth most important cereal crop after wheat, rice and maize. It is believed to be the first cereal crop that was domesticated by humans nearly 10,500 years ago in the Middle East. It is one of the most salt tolerant major crops and is highly adaptable to varied growing conditions and consequently planted in a wide range of areas including the marginal lands. The barley crop has a short growing season and is relatively drought-tolerant.

The major use of barley grain (60 percent) is as feed for different domestic animals including poultry, sheep, cattle and camels. A sizeable amount of barley grain is used for malting, for which it is most suited. Barley malt provides the raw material for the industries engaged in brewing and distilling. Both alcoholic and non-alcoholic beverages are produced from the malt. The rest of barley grain is consumed as food in different forms like soups, stews and bread. Barley is being promoted as health food for its high contents of beta glucans, which help in lowering blood cholesterol. The use of the whole grain regulates blood sugar for up to 10 hours, which makes it even healthier than wheat.

Over the past 13 years, ICBA has conducted an extensive research on barley. In 2012, ICBA embarked on a research project with the collaboration of the University of Montana in the United States to screen their international barley core collection of 2,750 accessions against salinity to select genotypes for breeding of salt tolerant barley at the center and other research institutes around the world with the same interests.

A barley spike may contain up to 60 grains

The Plant Genetic Resource Laboratory of ICBA carried out a thorough study on barley from the Arabian Peninsula. Around 3,200 accessions of barley landrace were collected from farmers' fields in the Batinah region of Oman. They were characterized for different spike and seed morphological traits to explore major variation in the characteristics for future selection and breeding programs. Local landraces usually out-yield the exotic material under the low input conditions that predominate in subsistence farming systems. In such conditions, native germplasm should be exploited to improve productivity.

Large variation exists among different barley cultivars

Barley plant height ranges from 70-120 cm

About 2,300 accessions of the Omani Batini barley landrace were also studied for salinity tolerance, genetic variation in germination and early seedling growth to establish the forage yield-salinity response for them. A high level of diversity for salt tolerance, within and among sub-populations of the Batini landrace, was demonstrated at the germination, seedling, and tillering growth stages. A large proportion of variance in seed germination attributes was accounted for by genetic differences among subpopulations. Positive associations were identified between germination attributes under stress and non-stress conditions. The salt-tolerant barley germplasm evaluated in this study should contribute to increasing barley production in arid regions under saline irrigation. The study led to the publication of five articles in peer reviewed journals.

Barley grain is rich in soluble polysaccharide β-glucan

By Mohammad Shahid and Abdullah A Jaradat