

# Strategic Research Program

## Program Area – Forage Crop Breeding

### Introduction:

The beef industry is a major sector of Saskatchewan agriculture, with close to three million cattle and calves in the province. The majority of the feed for these animals is supplied by grass and legume forage crops grown in the province. Forages for hay and pasture occupy a greater area of arable land in Saskatchewan than any other crop with the exception of wheat and canola. If one includes natural pasture, forage crops are found on a greater area of land than any other crop type.

A review of beef, feed and forage research and development activities done by MNP in 2011 identified forages as a priority area of for research; however, there has been a considerable reduction in the capacity for forage research due to non-replacement of retiring scientists in western Canada and program reductions.

Expanded investment in forage infrastructure and research has been recommended, with a specific recommendation for an additional SRP chair in forage breeding. A dedicated forage research chair will result in new options for Saskatchewan producers to help improve profitability, competitiveness and sustainability in the long-term. The greatest impact from this investment is expected to be felt in the beef industry (the single largest livestock sector); although benefits are also expected for the dairy, bison and sheep sectors as well as in forage seed production.

The program will collaborate with scientists having expertise in forage physiology and management and/or animal nutrition in the Western Beef Development Centre, the Animal and Poultry Science Department at the University of Saskatchewan, and the Agriculture and Agri-Food Research Centre in Swift Current.

### Goal:

To develop and make available improved high yielding and high quality forage crop cultivars which will reduce the cost of production for producers, thus increasing economic returns.

### Research Focus:

The forage research chair will focus on forage breeding with an emphasis on developing new forage varieties with improved yields and other desirable characteristics.

1. The major focus of the program will be the genetic improvement of the more important perennial forage crops seeded in Saskatchewan, including alfalfa, meadow brome grass, hybrid brome grass, and crested wheat grass, with other priority species to be identified through stakeholder consultation.
2. Secondary foci include
  - a. Genetic improvement of barley and oat for forage purposes to be carried out in conjunction with the SRP chair in barley and oat breeding.

- b. Collaboration in the exploration, assessment and development of native germplasm for forage crops.

Research areas to be considered include:

- Analysis of the genomes of priority species
- Identification of markers for marker assisted selection
- Analysis of lignin and fiber deposition using synchrotron beam lines
- Screening for stress tolerance – salinity, drought etc.
- Selection for improved NDF digestibility
- Interspecific hybridization

Expected outcomes:

- Higher yielding cultivars (either biomass or seed yield)
- Higher quality cultivars
- More stress tolerant cultivars
- Sequence or partial sequence of genomes of several species
- Useful genetic markers to facilitate selection
- New hybrid populations