# The Importance of Resistance Management on the Farm

***Written by BASF***

Not a single farmer has ever made the claim that farming is easy. Every year, they face new challenges and must adapt to the rapidly changing industry. Perhaps the most challenging is the increasing resistance to weeds, diseases, and insects. When resistance occurs, pest management usually becomes more difficult, more expensive, and crop yields may suffer.

Resistance to glyphosate and other herbicides is generally the first issue thought of when farmers hear about resistance management, but it is also important to consider fungicide and insecticide resistance. Practicing proper stewardship when using crop protection technologies can help curb resistance issues and keep land free of pests.

### Disease Resistance Management in Alfalfa

The tactics for disease resistance management are similar to insect and weed resistance management. Alfalfa disease management is accomplished by a combination of four main elements – cultural, genetic, and chemical methods, as well as fungicide resistance management.

- **Cultural Methods**
  Cultural methods include planting varieties in the right place under proper growing conditions. Once planted, crops need irrigation and nutritional attention to produce strong plants that can be less susceptible to disease damage. Decisions on cutting schedules and field rotation can also affect alfalfa disease prevalence.

- **Genetic Methods**
  There has been much progress in the last 20 years in improving the genetic resistance of alfalfa varieties to diseases. By using an adapted variety of alfalfa with good resistance scores to major alfalfa diseases, the risks of common and Lepto leaf spot, as well as spring and summer black stem, can be reduced.

- **Chemical Methods**
  It is important to know that a fungicide will not get rid of an existing infection, but will protect the treated leaf from further infection. Lower leaves tend to be most affected by diseases, so early placement on the new growth is most important for a fungicide to be effective. Several fungicides are now available for use in alfalfa and, with timely use, many have seen good results with increased yield as well as increased recovery and plant health after a cutting.

- **Fungicide Resistance Management**
  There has been a concern that a reliance on products with only one site of action will cause increased selection pressure that may lead to disease resistance to the chemistry. This is especially true in crops where multiple applications are made in the same season, such as treating prior to both the first and second cuttings. To reduce the risk of disease resistance, general recommendations are to rotate fungicide sites of action, or use mixes with multiple sites of action on key diseases. Luckily, Endura® fungicide offers farmers a unique mode of action to effectively control Lepto leaf spot and spring black stem. It is a preventive fungicide that inhibits new growth of fungal cells while also blocking the energy production in existing cells.

### New Option for Resistance Management

BASF received EPA registration for Priaxor® fungicide (pyraclostrobin + fluxapyroxad) in alfalfa in 2016. This is significant as it marks the first multiple-sites-of-action fungicide where both active ingredients are effective on key foliar alfalfa diseases. Use of this multiple-sites-of-action product provides overlapping disease control, helps reduce resistance potential, as well as provides the plant health benefits of increased growth efficiency and stress tolerance.

There is ongoing work in alfalfa pest biological control (e.g., insects, bacteria) helping suppress pests, but little is on the horizon for biological control of the key foliar diseases attacking alfalfa. Until new technology is available, resistance management efforts offer a crucial option to ensure farmers today and future generations of farmers can be successful in the field.