Higher potassium levels help alfalfa outgrow quackgrass

ITHACA, NY — A Cornell University researcher has found a way to suppress some weed pests in alfalfa fields without using herbicides while assuring continuing, good alfalfa yields.

Rhonda Janke, a graduate student in the New York State College of Agriculture and Life Sciences at Cornell, says that the growth of quackgrass can be held in check and alflafa can flourish if the recommended level of fertilizer potassium is maintained.

"If the potassium level is adequate, the alflafa yield could double," Janke says. "When the field is low in potassium, the quackgrass takes over, thus reducing the alfalfa yield greatly."

Recognizing the importance of her work, the Charles A. Lindbergh Fund has awarded Janke a $10,580 research grant to complete her project. A Ph.D. candidate in agronomy, Janke conducts her research under the direction of Gary Fick, a professor of agronomy.

In her work, Janke found that alflafa has the "competitive advantage" over quackgrass–by far the most common weed pest affecting alfalfa–when sufficient amounts of potassium are maintained. Competitive advantage refers to the ability of alflafa to maintain yield in the presence of quackgrass and to absorb adequate amounts of available potassium.

The potassium level needed to give alfalfa an advantage against quackgrass depends on the results of soil tests and soil types making up the alfalfa field. Thus, the amount of potassium required annually could range from a minimum of 25 pounds to as much as 200 pounds per acre, Janke explains.

In her experiments over the past three years, she used 100 pounds of potassium each year, based on soil tests conducted on her experimental sites.

When less than the required amount of potassium is applied, quackgrass gains the "upper hand." In other words, the quackgrass "steals" most of the potassium, leaving little for alfalfa to use. The resulting potassium deficiency in the alfalfa field leads to reductions in alfalfa yields, according to Janke.

Janke's work showed that if farmers apply adequate amounts of potassium each year after establishing the alfalfa crop, they could realize much higher alfalfa yields.

Preliminary results of her experiments conducted over the past three years showed that the alfalfa yield could double, thus increasing the quality and the amount of total hay (a mixture of alfalfa and weedy grasses) by as much as 50 percent.

"When alfalfa is fertilized with an adequate amount of potassium, alfalfa outgrows quackgrass," Janke points out. "Thus, there is no need to use large amounts of herbicides."

Such an herbicide-free alfalfa production method is conducive to the preservation of the environment, a factor that prompted the Lindbergh Fund to recognize the importance of Janke's work.

"The use of herbicides has many undesirable side effects on the natural environment," Janke explains. "Another problem with herbicides is that they are not effective on all weeds; some weeds are actually becoming resistant to certain types of herbicides."

At present, many farmers generally use herbicides on newly established alfalfa fields. After the first summer, however, the farmers tend to apply fewer herbicides or to apply inadequate amounts of fertilizer.

Janke's method of attaining good alfalfa yields by applying potassium, rather than using herbicides, keeps growth of the quackgrass suppressed, not eradicated. In fact, weeds such as quackgrass are beneficial to the soil, says Janke.

For one thing, weeds protect the soil from erosion. Some species penetrate and loosen the subsoil, allowing the nutrients to get to the plant roots easier. Weeds also provide a home for some insects that are beneficial to the alfalfa.

Janke's work to date has been mainly with quackgrass. Preliminary findings from her experiments indicate, however, that increased alfalfa vigor resulting from high levels of potassium suppressed several other kinds of weed pests, such as dandelion, plantain, and yellow rocket, as well as quackgrass.

Janke is running her experiment for another year to confirm what she has found out thus far, as well as to see more precisely what effect potassium has on other types of weed pests, particularly dandelion.