Plant Protection Programs University of Missouri

Integrated Pest & Crop Management

Inter-Seeding Legumes in Pastures can Offset High Nitrogen Prices

By John A. Lory and Rob Kallenbach

High nitrogen prices have farmers scrambling for ways to reduce fertilizer costs on Missouri pastures. One possible option is inter-seeding a legume such as red clover, birdsfoot trefoil, or lespedeza. Legumes fix nitrogen from the atmosphere providing the nitrogen needed for their own growth and sharing some their nitrogen with neighboring grass plants.

Legumes transfer up to 20% of the nitrogen they fix to the surrounding grass. Legumes have the capacity to fix 50 to 300 pounds of nitrogen per acre so the potential contribution can be significant. Grass doubly benefits from the legume, it gains fixed nitrogen from nitrogen transfer and the grass benefits from reduced competition for the limited nitrogen already in the soil.

Here are some tips to succeed with inter-seeded legumes:

Phosphorus and pH are important! Legumes need a higher soil test values to succeed than do most grasses. In low fertility pastures legumes will germinate but fail to establish.

The following table provides guidance for the minimum soil test levels for stand success. Optimum phosphorus soil test is 40 to 45 pounds per acre. Raising soil test levels to the minimum should allow legumes to establish in a pasture. Raising soil test levels from the minimum to the optimum should increase forage yield and quality of both grasses and inter-seeded grasses. It is recommended to wait 6 months after liming before seeding legumes on low pH soils.

Minimum soil test levels for success

Forage	pH	Soil test phosphorus (lbs/acre)	Soil test potassium (lbs/acre)
Alfalfa	6.5	40	300
Red Clover	6.0	25	250
White Clover	5.5	25	250
Birdsfoot Trefoil	5.5	20	225
Lespedeza	5.0	20	200

Do not apply nitrogen! Fertilizer nitrogen increases the competitive advantage of grasses hurting establishment of inter-seeded legumes. Missouri research demonstrated that as little as 25 lbs/acre spring nitrogen reduced lespedeza in a mixed sward and 100 lbs/acre essentially eliminated it. Low rates of nitrogen (up to 50 lbs/acre) may be considered in August to promote fall grass growth on established mixed stands.

Options for seeding include frost seeding and no-till drill. Optimum seed depth is ¼ inch and it is better to be too shallow than too deep. Recommended seeding rates are 4 lbs/acre for red clover, 6 lbs/acre for birdsfoot trefoil and 10 lbs/acre for lespedeza and alfalfa. The objective is a stand that is about 30% legumes. Minimize grass competition during establishment by keeping grass short when legumes are germinating. This can be accomplished through flash grazing or clipping in early spring.

Legume-grass pastures are different from grass-only pastures fertilized with nitrogen. They will typically be slower to start vigorous growth in early spring but may hold quality and production later into the early summer. Low soil test levels, too much nitrogen in the soil, and/or too much grass competition can lead to poor results from inter-seeding legumes.

There have always been good reasons to inter-seed legumes into pastures. Legumes improve the quality of forage, particularly in endophyte-infected tall fescue pastures. Legumes can eliminate spring nitrogen applications reducing fertilizer nitrogen need up to 100 lbs/acre. High nitrogen prices make this an even more attractive management choice. The savings in nitrogen fertilizer more than cover seeding costs. Some of the savings can be used for lime, phosphorus and/or potassium on fields with low soil tests.

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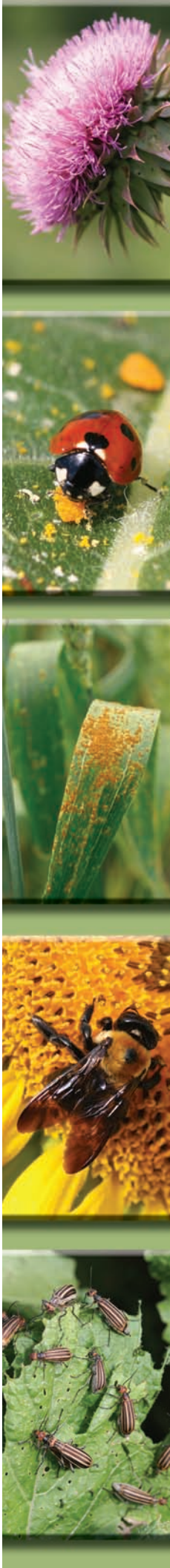

Managing High Fertilizer Prices on Pastures

By John A. Lory and Rob Kallenbach

High nitrogen prices have farmers reconsidering nitrogen management on forages. High nitrogen prices make the costs of over-application that much more costly. On the other side of the ledger, hay and beef prices also have increased so the costs of under-application have also increased.

Farmers are well served by re-assessing nitrogen fertilizer management decisions. The value of good management has never been higher because of the combination of high fertilizer and commodity prices.

The core rules for making nitrogen fertilizer pay in forage systems have not changed:

Fertilize when the plant has a capacity to respond.

Maximize forage utilization.

Fertilizer only pays if it increases the amount and/or quality of beef, milk or hay sold from your farm. High fertilizer prices favor farmers who harvest high quality hay and maximize forage utilization on pastures.

Fertilizer prices have been steadily increasing since 2002. National Agricultural Statistics show fertilizer nitrogen price has essentially doubled in the past five years. This spring prices are projected to be 30% greater than last year. The increase in fertilizer price has been partially offset by an increase in the value of gain for feeder cattle. Since 2002 the value of gain on steers has increased 50% and this trend will continue with high grain costs.

The following scenario helps put the value of fertilizer in perspective on a pasture. Assume an operation applies 120 pounds of nitrogen per acre resulting in about three tons of forage production. A moderately efficient operation may produce 225 pounds of gain per acre on this pasture. In 2002, cost of the nitrogen fertilizer price per pound of gain was $0.16. By 2007, higher fertilizer prices had doubled the cost to $0.32 per pound of gain. To look at in from a different perspective, in 2002 nitrogen fertilizer costs represented 31% of the total value of gain per acre. In 2007, higher fertilizer prices had increased that to 42%.

The higher fertilizer costs make forage utilization and management more critical than ever. For instance, increasing gain per acre from 225 to 275 pounds through improved forage management would reduce fertilizer costs as a percentage of the value of gain per acre to 34%, a value marginally higher than in 2002 despite higher fertilizer prices.

High fertilizer prices force farmers to make smart fertilizer decisions to make fertilizer pay on forages. Farmers that apply fertilizer only when they need increased production and farmers that maximize utilization of forage will maximize fertilizer value.

Management options to increase return on fertilizer dollars include:

Adopt management practices that increase forage utilization in pastures such as management intensive grazing.

Note that management intensive grazing increases the nitrogen value of manure returned to the pasture by grazing animals. We estimate you can decrease recommended nitrogen rates 20% for the same yield goal on management intensive pastures.

Only fertilize when you need increased forage production.

Cool season grasses respond to spring fertilizer but do you need that extra production? Unless you harvest excess spring production as hay, carefully consider spring fertilizer rates.

Consider alternate sources of nitrogen.

Legumes remain an excellent source of nitrogen for pastures.

Manure may be a more economical source of fertilizer nutrients. Remember that manure nitrogen is typically 50 to 60% available when it is surface applied but 100% of manure phosphorus and potassium is available to the crop.

High fertilizer prices rewards good management decisions on fertilizer and forage management. Now more than ever it pays to be smart about fertilizer on forages!

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Safeguarding Missouri's Citizens and Agriculture Through Pesticide Applicator Training

By Steven Kirk

The safe and responsible use of pesticides is of up-most importance to Missouri's agricultural sector and its citizens. All pesticides used in the U.S. must be registered (licensed) by the Environmental Protection Agency (EPA). Registration of pesticides assures they will be properly labeled and if used in accordance with specifications, will not cause unreasonable harm to the environment.

During the decade that made up the nineteen-sixties, there arose a new awareness of ecology and the environmental resulting in an outcry of public concern over all types of environmental contamination from smoking, belching chimneys and smog; foul water, rivers and streams, as well as pollution from pesticides. Up until that time the old adage of "if a little works, a lot will work better!" was the major premise for applying chemicals to

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address pest problems on the farm and around the home.

As a result of this public outcry, the EPA and Congress enacted a "new" pesticide law, *the Federal Insecticide, Fungicide, Rodenticide Act* (FIFRA) in the early 1970s that provided the impetus to establish a national program of federal/state certification of pesticide applicators. The primary focus of this new law was to provide federal control of pesticide distribution, sales, and use. Under FIFRA, the EPA was given authority not only to study the consequences of pesticide usage but also to require users to register when purchasing restricted use pesticides. One of the goals of this program would be to provide the quantity and quality of information needed for various levels of persons using pesticides, ranging from structural pest control specialist to farm laborers.

Because of continuing public concerns over potential effects of pesticides on human health and the environment, new laws and regulations that govern pesticides and their use make an intensive training program essential. For example, there were several changes in the recently implemented Worker Protection Standard. Additional new legislation which provides training opportunities for this program includes the Endangered Species Program and the Federal Record keeping Requirement.

The University of Missouri along with the Missouri Department of Agriculture provides certification and recertification for this diverse sector of individuals involved in the pesticide industry. Since the inception of Missouri's pesticide training program, over 6,000 commercial pesticide applicators have received at least initial training. Every three years, these applicators must be recertified by training programs conducted by University Extension as mandated by the Missouri Department of Agriculture's Bureau of Pesticide Control.

The University of Missouri Extension Pesticide Program provides educational outreach for individuals aspiring to become licensed commercial pesticide applicators as well as private applicators. If you engage in the application of a restricted-use pesticide for hire you are considered a commercial applicator. If you engage in pesticide application for the purposes of producing an agricultural commodity on property you or your employer owns, or rent without compensation other than trading of personal services between producers of agricultural commodities you are considered a private applicator. Private pesticide applicator training is available at the local level through your regional extension offices. It requires no exam to be certified or recertified.

The commercial applicator program involves two areas of instruction: a core training session in which all trainees attend and the specialty category section in which the attendees conduct their business activities. The core training session provides basic pesticide knowledge which impacts all pesticide applicators. The instruction is provided by persons representing several agencies including the Missouri Department of Agriculture, Missouri Department of Natural Resources and University Extension.

Missourians wishing to become licensed commercial applicators must pass a core exam, as well as a category exam tailored to the specific area in which they wish to become certified. There are 11 different specialty categories within the commercial PAT program (category 1 has two sections: 1A: Agricultural Plant, and 1B: Ag. Animal Pest Control and category 7 has three sections: 7A: General Structural Pest; 7B: Termite; and 7B: Fumigation Pest Control). Applicators can be certified in one or more of the following categories depending on which area of expertise you are qualifying for.

Commercial Pesticide Applicator Categories:

- Category 1A: Agricultural Plant Pest Control
- Category 1B: Agricultural Animal Pest Control
- Category 2: Forest Pest Control
- Category 3: Ornamental and Turf Pest Control
- Category 4: Seed Treatment Pest Control
- Category 5: Aquatic Pest Control
- Category 6: Right-of-Way Pest Control
- Category 7A: General Structural Pest Control
- Category 7B: Termite Pest Control
- Category 7C: Fumigation Pest Control
- Category 8: Public Health Pest Control
- Category 9: Regulatory Pest Control
- Category 10: Demonstration and Research Pest Control
- Category 11a: Wood Products Pest Control
- Category 11b: Ground Line Inspection and Preservative Retreatment of Standing Wood Utility Poles

Training programs are conducted every January in Springfield, Kansas City, Cape Girardeau, St. Louis and Columbia. For dates and locations check out the Plant Protection Programs web site at: http://ppp.missouri.edu/pat/training.htm.

(Information used in this article came in part from MU Extension publications and Purdue Extension)

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Weather Data for the Week Ending January 22, 2008

By Pat Guinan

		Weekly Temperature (oF)						Monthly Precipitation (in.)		Growing Degree Days‡	
Station	County	Avg. Max.	Avg. Min.	Extreme High	Extreme Low	Mean	Departure from long term avg.	Jan 1-22-Jan	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	24	3	39	-6	14	-11	0.12	-0.44	*	*
St. Joseph	Buchanan	23	6	38	-4	16	-10	0.73	0.26	*	*
Brunswick	Chariton	28	10	39	-1	19	-7	0.39	-0.55	*	*
Albany	Gentry	22	0	35	-16	13	-12	0.39	-0.27	*	*
Auxvasse	Audrain	33	11	48	0	21	-6	2.28	1.05	*	*
Columbia	Boone	33	12	48	1	22	-6	2.43	1.19	*	*
Sanborn Field	Boone	33	14	49	3	23	-6	2.72	1.48	*	*
Williamsburg	Callaway	33	12	50	0	22	-5	2.08	0.37	*	*
Novelty	Knox	29	8	48	-4	17	-8	0.77	-0.11	*	*
Linneus	Linn	26	7	40	-7	16	-9	0.6	0.03	*	*
Monroe City	Monroe	32	10	49	-1	20	-6	1.91	0.85	*	*
Versailles	Morgan	34	14	51	4	23	-7	1.66	0.35	*	*
Green Ridge	Pettis	33	14	48	4	22	-6	1.54	0.41	*	*
Lamar	Barton	36	18	48	9	26	-5	0.68	-0.66	*	*
Cook Station	Crawford	36	12	48	0	25	-7	2.25	0.66	*	*
Alley Spring	Shannon	37	9	47	1	25	-5	0.67	-1.1	*	*
Round Spring	Shannon	37	9	46	0	24	-6	0.49	-1.29	*	*
Mountain Grove	Wright	34	14	47	5	23	-7	1	-1.06	*	*
Delta	Cape Girardeau	35	18	41	9	27	-4	1.64	-0.54	*	*
Cardwell	Dunklin	38	21	44	13	30	-4	1.06	-1.41	*	*
Clarkton	Dunklin	37	19	44	9	29	-4	0.93	-1.27	*	*
Glennonville	Dunklin	37	22	43	13	30	-3	1.5	-0.7	*	*
Charleston	Mississippi	36	19	43	10	28	-4	1.58	-0.59	*	*
Portageville-Delta Center	Pemiscot	38	22	44	13	30	-3	1.22	-1.29	*	*
Portageville-Lee Farm	Pemiscot	*	*	*	*	*	*	*	*	*	*
Steele	Pemiscot	39	23	45	14	31	-3	0.74	-1.8	*	*

* Complete data not available for report

‡Growing degree days are calculated by subtracting a 50 degree (Fahrenheit) base temperature from the average daily temperature. Thus, if the average temperature for the day is 75 degrees, then 25 growing degree days will have been accumulated.

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