



Alfalfa in Annual Cropping Systems: A Producer Profile

Including perennial forages such as alfalfa in a crop rotation has long been recognized as a sound agronomic practice. Prior to the development of commercial fertilizers and herbicides, alfalfa was an essential component of a grain system as it added nutrients to the soil and interrupted pest cycles. As modern day agriculture moved to cropping rotations that used only annual crops, the use of forages as part of a rotation fell into disfavour. In recent years, however, interest in perennial forages as part of an annual crop rotation has been increasing.

Dr. Martin Entz¹, professor at the University of Manitoba, has been studying perennial forages and their value to annual cropping systems for several years. He has identified a number of benefits to an annual cropping system in which perennial alfalfa has been included.



Alfalfa is a forage legume long recognized not only as an excellent feed source but also for its ability to build soil fertility levels.

- 1) **Rotational Yield Benefits:** In the moister regions of the Northern Great Plains of North America, research has shown that there is a yield benefit to successive annual crops following an alfalfa crop. In very wet areas, alfalfa served to control soil salinity, making those acres affected by salinity much more productive for at least two years following termination of the alfalfa stand. Alfalfa may not create any immediate rotational yield benefits in areas where moisture is limiting. However, the benefits appear long-term rather than short-term. In one Lethbridge study, yield benefits lasted 20 years!
 - 2) **Soil Nutrient Status:** Due to its ability to fix its own nitrogen (N), research is suggesting that short-term alfalfa stands could maximize N input. The N added to the soil by the alfalfa, in turn, decreases energy requirements for an annual cropping system.
 - 3) **Soil Quality:** The soil's physical condition is often improved by including forages in a rotation. Soil aggregates tend to be larger and the amount of C stored in the soil is greater than in annual cropping systems lacking perennial forages.
 - 4) **Pest Management:** Weeds such as wild oat, green foxtail and Canada thistle are often less dominant in annual crops following alfalfa. Dandelions, however, tend to be favoured by the alfalfa. The disease sclerotinia is common to many broadleaf crops, including alfalfa. This means in the 2 years following alfalfa there can be an increased incidence of the disease in subsequent broadleaf crops. Cereal crops, especially warm season cereals such as corn or millet, or cool season barley, oats, triticale (cereals with more extensive root systems) will significantly benefit from the soil effects of alfalfa in the rotation.
 - 5) **Economic Benefits:** Research is showing that a short-term forage crop (2 – 3 years) has economic benefit in annual cropping systems.
 - 6) **Environmental Benefits:** The deep and woody roots of the alfalfa act as storage for atmospheric carbon, like a bank holds money on deposit.
- Growing alfalfa in rotation has proven to be a good choice for one central Saskatchewan farmer. Ernie Luchsinger of Rosthern has found the practice to be beneficial to the farm, both agronomically and economically.

Ernie first seeded alfalfa in 1998. He likes to seed the alfalfa at a rate of 1.25 – 1.5 lbs/ac. Weed-free fields are essential for good alfalfa seed production. Canada thistle and Russian pigweed, two weeds that thrive in northeastern Saskatchewan, are difficult to control in an alfalfa crop. To minimize their presence, Ernie applies glyphosate pre-harvest to the cereal crops grown prior to the alfalfa. Prior to seeding the flax and alfalfa, he applies a pre-seed burn-off of glyphosate. He usually seeds the flax in early May, sidebanding the N, P and S fertilizer. Once the flax has emerged and is at the proper stage, he will apply a tank mix of Buctril M® and Select®. When the flax is 4 – 5 inches tall, he will then seed the alfalfa. In years when he seeds the flax and alfalfa together, his options for weed control are more limited.



Ernie Luchsinger seeds with a Flexi-coil 5000 airdrill with liquid fertilizer.

After three years of production, it's time to terminate the alfalfa. Ernie achieves this either by burning the stand in the spring or applying glyphosate at a rate of 1.0 L/ac. Both methods produce similar results; however, in order to reduce GHG emissions, the herbicide application is the preferred method. Once the alfalfa has been terminated, Ernie likes to seed a cereal, usually wheat or barley. Four years will pass before the field can be seeded to alfalfa again as it takes that long to rid the field of alfalfa volunteers.

Like many other broadleaf crops, alfalfa is susceptible to sclerotinia. While Ernie seeds canola the second year after alfalfa, he recognizes that there may be an accumulation of sclerotia bodies and that if the conditions are right, he may have to apply a fungicide to the canola.

The benefits of alfalfa in rotation take a couple of years to become evident. Ernie soil tests each field every year and has found the first crop (cereal) following an alfalfa crop has similar nutrient requirements as fields where there has

been no alfalfa. It is in the second and third years that the soil has greater N-supplying power thereby requiring less commercial fertilizer. Ernie has observed other benefits to crops succeeding alfalfa such as better water infiltration and fewer wild oats.

While including alfalfa in rotation, especially for the purpose of harvesting seed is labour intensive, it has enhanced the soil's productivity and improved the Luchsinger farm's bottom line.

Sources

¹ Dr. Martin Entz, University of Manitoba. Saskatchewan Soil Conservation Association 2002 Annual Conference Proceedings Pages 88 – 99.

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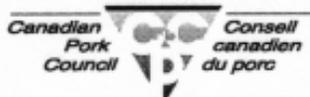


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