ALBERTA AGRISYSTEMS LIVING LAB

Annual Cropping with Covers: From Research to Ranch

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With increasing pressure from unpredictable weather, rising fertilizer costs, and the desire to build long-term soil health, more farmers and ranchers are exploring the role of annual clovers in their cropping systems. Clovers can reduce nitrogen fertilizer needs, suppress weeds, improve forage production, and support soil health. Research shows that certain clover species, such as berseem and alsike, can reduce weed biomass by up to 40% and provide substantial forage yields. Other research explores the role of red clover as a living mulch in corn-wheat-soy rotations, highlighting its ability to supply up to 80 lbs/acre of nitrogen, maintain corn yields, and reduce weed pressure by 65%.

Annual clovers (like berseem) and biennial clovers (like sweet clover) grow quickly and can fix nitrogen in the soil, support biodiversity, and protect against erosion. In cropping systems, they are used in a couple of ways:

- **Companion crop/intercropping**: Clovers are seeded with cash crops like peas, canola, or wheat. The goal is to improve soil health and reduce inputs without harming yield.
- **Living mulch**: Clover is not terminated before seeding the main crop but instead is maintained between rows during the growing season to suppress weeds and fix nitrogen.

We talked to two Alberta producers who are applying these practices in real-world conditions. Their experiences, along with scientific research, show that clovers can be a valuable tool for crop and livestock operations.

Key Takeaways for Annual Cropping with Covers:

1. **Clovers are not one-size-fits-all**: Different species work better in different regions and crop systems—match clover to your context.
2. **Management matters**: Success depends on seeding rates, depth, timing, and using tools like strip-till or dual-depth drills.
3. **Start small and stay flexible**: Try test strips first and adapt plans based on weather, crop response, and forage needs.
4. **Clovers cut costs and build soil**: Companion clovers can reduce nitrogen needs, boost organic matter, and support long-term soil health.

5. **Moisture timing is critical**: Seed into moisture or before rain—timing beats calendar for good establishment.

What the Research Says: Lessons from the Field

Ross et al. (2001) focused on weed suppression using clover species in Alberta (Western Canada), where short growing seasons and moisture limitations are key considerations. They found that berseem and alsike clover suppressed weed biomass by up to 40% in mustard trials and produced up to almost 3 tons/acre of biomass. However, clover species varied in effectiveness: white Dutch clover increased weed pressure and was deemed unsuitable for this purpose. Mowing further enhanced suppression in some situations, showing that mechanical management can complement biological control (Ross et al., 2001).

Wyngaarden et al. (2015) conducted their work in Southern Ontario —a region with higher rainfall and longer growing seasons. They proposed using red clover as a living mulch in corn and frost-seeding it into wheat. In their trials, red clover reduced nitrogen fertilizer needs by up to 80 lbs/acre, helped maintain corn yields between 3.6 and 4.6 tons/acre, and cut weed pressure by 65%. They emphasized the importance of strip-tillage and precision banding of herbicides and fertilizer to make the system work (Wyngaarden et al., 2015).

On-the-Ground Experience: Two Alberta Producers Share Their Stories

Still Experimenting, Still Learning

Tom Schierman is in the Vulcan area, and has been experimenting with annual clovers in broad-acre crop systems to improve soil health and aims to reduce input costs; however, further assessment is needed to fully assess costs and savings. His trials have focused on sweet clover seeded with wheat, peas, and canola. The most promising results came from pairing clover with peas, where clover established well and had no negative impact on yields. In contrast, pairing clover with canola at higher seeding rates (8 lbs/acre) led to excessive biomass and slight yield losses for the canola. He now recommends lower seeding rates for companion clover (3-4 lbs/acre). Dual-depth seeding is a crucial part of his strategy, placing small clover seeds higher and larger primary annual seeds deeper.

Harvest of the annual crop proceeds as usual, following typical practices for monocropped wheat, peas, or canola. The presence of clover does not interfere with standard harvest equipment or timing. In the spring following harvest, clover regrowth varies depending on species and conditions. In most cases, sweet clover does not regrow vigorously enough to

require management, though in some years or with certain varieties, limited regrowth may occur. If present, it can be managed with an early burn-down or herbicide application as needed. Tom continues to monitor regrowth dynamics to determine the best spring management approach.

Tom is still experimenting with timing, species compatibility, and herbicide options, particularly in dry years where moisture is a major limitation. He is optimistic about clover's potential, especially as part of nitrogen reduction strategies and soil-building systems.

Top Tips

1. **Cover Seeding Rate**: Use low clover seeding rates (3–4 lbs/acre) to minimize competition.
2. **Dual Seeding Depth**: Invest in a dual-depth drill for multi-species planting.
3. **Monitor soil moisture:** clovers need early rain to establish well.

Focused on Rejuvenation and Flexibility

Vern Crone operates a mixed livestock and forage enterprise located near Hardisy and has used clovers to rejuvenate aging hay stands and improve regrowth in mixed stands. One approach he's found effective is sod-seeding a mix of oats, triticale and sweet clover (60-30-3 lbs/acre) into alfalfa stands. He cuts the crop for greenfeed mid-season, which not only provides feed but also encourages strong regrowth of alfalfa and triticale, with the potential for fall grazing or harvest depending on regrowth and moisture conditions. However, producers should be aware that sweet clover can pose a risk if it becomes mouldy, ensuring proper drying and storage is critical. This approach helps maintain productivity on older forage fields and reduces reliance on nitrogen fertilizer.

Vern's philosophy centers on flexibility, soil-first thinking, and working with nature. He values planting into moisture, planning around expected rain events, and making cropping decisions that allow multiple outcomes such as grazing, haying, or swathing, depending on what the season delivers. This flexibility is especially important in dry years, where Vern emphasizes having multiple potential uses for a crop depending on how it establishes and how much rain is received. For example, a diverse polycrop mix with species like peas, chicory, and turnips can be grazed standing, swathed and then grazed, or possibly baled if conditions allow. This approach allows him to respond dynamically to seasonal variability, matching crop use with feed demand and field conditions. He also emphasizes that even with nitrogen-fixing legumes, the recommended nitrogen rate can go a long way in getting the crop started.

Top Tips

1. **Stay flexible**: Harvest goals, adapt grazing, haying, or swathing plans should be adapted as the season unfolds.
2. **Greenfeed Harvest**: Target a greenfeed harvest mid-season to support regrowth and soil health.
3. **Fertilizer Application**: Apply starter nitrogen even with legumes to ensure early vigour.

References

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