Penn State **Extension**

Impacts of Interseeding on Corn Yield

Relay cropping or interseeding of cover crops in corn has resurfaced as a potential way of establishing cover crops in areas where cover crop establishment is impractical due to the late harvest of the primary crop. Relay cropping is not a new practice in corn.

Broadcasting ryegrass at the last cultivation was considered a standard recommendation in the 1940's in Pennsylvania (Dickey, 1947) to help curb erosion of tilled fields. Our recent work at Penn State has demonstrated that the practice can be effective as well in establishing cover crops to protect and improve soils and provide many of the benefits that cover crops can provide.

There is some concern about the impact of the cover crop on the corn. In most cases, though, we have observed that the corn is very competitive with the cover crop. The concept is to seed the cover crop so that establishment occurs following the "weed free" period (6-7 weeks after planting) so that any impact on the corn is minimal, provide weed control treatments at interseeding and use cool season cover crops that are not as competitive as warm season weed species. We are currently conducting a multistate trial with interseeded cover crops in NY, PA, VT and MD to further assess yield impacts of interseeded crops in our region.

Our initial results are supporting the concept that yield impacts are minimal. In our 2013 trial at Rock Springs where we got good establishment early of several species, the impacts on corn yield were negligible (Figure 1). We are conducting these studies across a range of environments to better understand the relationship between interseeding and grain yield. Our hope is that any yield impacts in the year of interseeding would be offset by higher yields, better soil quality and less fertilizer use in subsequent years.

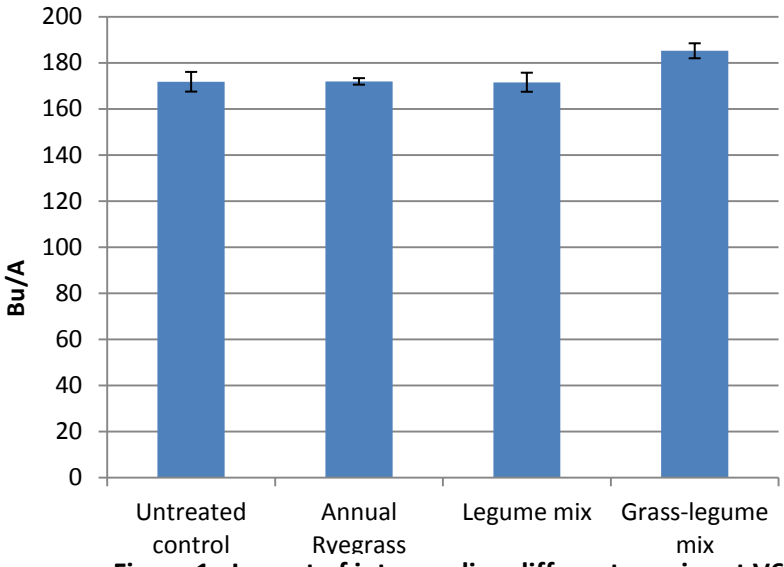

Figure 1. Impact of interseeding different species at V6 on corn grain yields at Rock Springs in 2013.

A number of published studies have evaluated interseeding in the literature and have generally found no impact on corn yield with plantings at the V4 to V7 stages of growth, or 4 to 7 fully exposed leaves. A Cornell study concluded that intercrops of red clover, ryegrass and other species had no impact on corn yields when the interseeding was done at the 6 to 12 inch tall corn stage (Scott et al, 1987). A Michigan State study (Baributsa et al., 2008) found that interseeding red clover or chickling vetch in corn over four years had no impacts on corn yields and that the clover could provide N to a succeeding crop.

Canadian studies have found similar conclusions. In Ontario, a two year study concluded that intercropping corn with red clover could provide soil protection without impacting silage corn yields (Wall et al., 1991). In Quebec, Carruthers et al. (2000) also showed that intercropping with forages seeded 3 weeks after corn planting did not impact corn yields and concluded "The ability toproduce silage equal in yield to monocrop corn at a reduced cost and risk of environmental damage makes this an attractive intercropping system for eastern Canada". In British Columbia, relay cropping with ryegrass planted at the 3 to 6 leaf stage is an accepted practice described in an advanced production manual for corn silage (Bittman and Schmidt, 2004). They note that planting ryegrass before the 3 leaf stage may suppress corn growth. Relay cropping in that region has been shown to dramatically reduce runoff from manured silage corn fields (van Vliet, 2002).

South American studies are also evaluating intercropping and have found similar results. One recent example of the studies there is that Borghi et al. (2013) concluded that Intercropping systems with corn and guineagrass did not reduce the corn grain yield compared with sole corn crops.

This is not an exhaustive list of the literature on the topic of yield impacts of interseeded crops, but provides a sampling of the evidence that cover crops can be intereseeded in corn with minimal impacts on yield in the year of intereseeding.

However, as with the introduction of any new technology, there will likely be some new concepts learned about this system and continuing improvements in management. In the introduction of no-till corn for example, weed control, soil compaction and planting issues often reduced yields in initial work, but eventually these were overcome with improved management to reap the benefits of no-till crop production. Our goal is that we can achieve the same with the concept of interseeding cover crops.

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