Smooth Bedstraw Management

Smooth bedstraw (*Galium mollugo* L.) is becoming a serious weed in pastures, hayfields and field margins across the Maritime region (Figure 1). This plant typically occurs first along roadsides, progressively moving inwards. Its invasive nature allows smooth bedstraw to out-compete forage species, reducing the value of the stand. Smooth bedstraw is especially problematic within lower input forage areas. This weed contains the toxin anthraquinone that can cause systemic toxicity and skin disorders in mammals. Poor animal performance on high diets of smooth bedstraw has been observed. Proper identification is essential for control.

Figure 1. Smooth bedstraw infestation within a New Brunswick hayfield.

Identification

Smooth bedstraw is a perennial plant with many, upright, square stems. These stems can be 25 to 120 cm (10 to 48 inches) long and tend to be weak. It is able to reproduce by seed and underground stems, contributing to the clumped growth habit. The entire plant is smooth to the touch and this fact is one distinction between smooth bedstraw and a related species, cleavers or rough bedstraw (*Galium aparine* L.) which is extremely rough and clinging to the touch. As shown in Figure 2, the leaves form a whorl (grouping of 6-8 leaves around the stem) and are typically 10-30 mm (3/8 to 1 1/8 inches) long by 2-4 mm (1/16 – 1/8 inch) wide. Flowers are clustered at the end of branches and are quite small (2-4 mm or 1/16 – 1/8 inch) with white petals (Figure 3). Flowering typically occurs in late June to early July but may continue into August if the plants are cut. Smooth bedstraw is adapted to a wide range of growing conditions, surviving in low-use hayfields of low fertility and pH as well as fields with higher levels of management. This plant prefers high moisture conditions but can tolerate drought.

Figure 2. Stem and leaves.

Control

Smooth bedstraw is particularly difficult to control in forage crops, especially if desirable forage legumes are present. Management is easier before the plant is fully established in the field, so crop scouting and spot control applications around field margins is key to avoid weed movement into a field area.

Figure 3. Flowers clustered at ends of stems.

Cultural Management

Optimizing forage performance will help improve forage competition with smooth bedstraw. Adequate nutrients for the forage should be applied. Maintaining fertility levels (keeping the stand from becoming run-down) is important to keep bedstraw from establishing within a field. The pH of the soil should be raised to at least 6 to limit the competitive ability of the weed. Multiple cuts of hay or repeated mowing should also be used to keep the grasses actively growing and reduce the reproductive ability of the weed. Grazing should be avoided as animals may prefer forage species over bedstraw, which allows the bedstraw to become more competitive with the forage. When applied simultaneously, these cultural practices make the forage stand more competitive with smooth bedstraw and can act to prevent an infestation.

Mechanical Management

Mowing will reduce the vigour of established bedstraw plants but will not reduce the number of plants within a field as plants are able to re-grow from underground food reserves. Mowing can limit the seed production of the plant, reducing the ability to spread further in the field although it may not be a viable long term management strategy. Combining mowing treatments with increased fertility can improve the long-term control of this weed.

Another option for severe infestations is to take the land out of forage production for at least two years. The field should be plowed and then planted to an annual crop. An application of glyphosate prior to tillage may reduce the ability of smooth bedstraw to re-establish. Annual crops will re-grow quicker than bedstraw and will form a dense canopy to limit further germination of this weed species. The process of seeding each year will decrease the competitiveness of the perennial smooth bedstraw as well. Although expensive, this may be the only measure that is successful for severe infestations.

Herbicide Management

The management of smooth bedstraw through the use of herbicides can be difficult to achieve. Previous research in New Brunswick has shown that herbicides containing 2,4-D, MCPA, glyphosate, dicamba and mecoprop must be applied at a high rate to provide control. Control levels were not consistent over multiple experiments, although triclopyr (90-100% control) and mecoprop (65-85%) gave the most reliable control results. Herbicide activity was greater for smooth bedstraw plants that were 20 cm (8 inches) tall compared to larger plants (30 cm or 12 inches tall). With respect to forage harvest, herbicide applications after two weeks of plant re-

growth improved weed control as compared to applications immediately after cutting. Research from AAFC Charlottetown showed that triclopyr, tested at the 480-1920 g ai/ha rates, offered 90 % or greater weed control into the second season and bedstraw biomass was reduced by 95 % as compared to non-treated areas. All rates of triclopyr significantly improved grass biomass in year 1, with the higher rates providing the greatest improvement. Mecoprop and dicamba + mecoprop at high application rates provided control for one field season and suppressed the weed in the second season. This application also significantly improved grass biomass within the first season. Other herbicides tested (dicamba, dicamba + MCPA, dicamba + MCPA + mecoprop, clopyralid) did not provide control within the first season or improve grass biomass at the rates evaluated.

Herbicide trial work to evaluate herbicide options for smooth bedstraw control was initiated in New Brunswick near Bathurst in 2007 and Scotch Settlement in 2009. Herbicides were applied two to three weeks following forage harvest, when smooth bedstraw regrowth had reached 5-10 cm. All rates of triclopyr tested between 480-1920 g ai/ha and aminopyralid rates between 60-120 g ai/ha offered greater than 95 % smooth bedstraw control in the season of application (Figure 4). Other herbicides, including MCPA amine, 2,4-D amine and MCPA amine + mecoprop + dicamba, demonstrated early suppression of the weed, but were ineffective by the end of the first season. At the Bathurst location, which had a high bedstraw population, triclopyr and aminopyralid significantly improved grass species ground cover in the year following application. Grass groundcover was almost tripled as compared to non-herbicide treated areas. At this location, bedstraw control was evident two years after application within the triclopyr and aminopyralid treatments.

Figure 4. Untreated (L) and triclopyr (R) effect one month after treatment.

Each of the herbicides mentioned may kill other plants present, including desirable clover varieties. Producers should consider the effect of legume loss after herbicide application as compared to the benefit of smooth bedstraw control. Triclopyr and aminopyralid have differences in weed control spectrum, grazing restrictions and price. Proper choice will depend on individual field situations. Please consult product labels for proper application rates, timings, weeds controlled and grazing/forage restrictions.

Conclusion

Smooth bedstraw can be an invasive species in forage crops. Once established, it is very difficult to control. Producers must use a variety of management strategies to limit the potential damage from this weed species. A triclopyr or aminopyralid application following forage harvest has shown a high level of bedstraw control in experimental evaluations and may be a viable option for high-value grass forage stands in New Brunswick.