Black Medick—Friend or Foe?

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Black medick can be both a friend in cropping systems and a foe if it becomes a serious weed problem in crops such as lentils. Wetter growing conditions, changes in cropping systems, and other factors may be the reason black medick is rising in rank in weed surveys in Saskatchewan and Manitoba. Field scouting, especially during the fall, proper identification, and developing long-term management strategies including long (minimum of four crops), diverse rotations are important for plants like black medick in cropping systems.

Black medick (*Medicago lupulina*) is an introduced annual, biennial, or short-lived perennial legume found across Canada. Like many plants, black medick can be both beneficial and problematic, depending on where it is located. Black medick can be a beneficial self-seeding cover crop, nitrogen-fixer, weed suppressor, and annual forage in cropping systems, but it is also a common weed in lawns, gardens, roadsides, and cultivated fields (Figure 1). Black medick is a close relative of alfalfa (*Medicago sativa*).

For pulse growers, particularly with non-competitive legume crops like lentils, beans, and chickpeas, black medick can become a problem weed that is difficult to control in-crop. In 2016, a few experienced lentil growers in Saskatchewan identified a black medick weed problem at harvest in some fields. This could be attributed to the wetter than normal growing conditions, a gradually increasing seed bank, misidentification as other weeds or diseases, or shortened rotations. In one badly infested field, yields were 25-30 per cent less than adjacent fields with only a few patches of black medick.

Growers, buyers, and agronomists are encouraged to learn more about black medick and how to identify it as a plant, and as a seed, to prevent misidentification at harvest with other weed problems, or a disease like sclerotinia. Better knowledge will help growers find ways to manage and control the weed in cropping systems.

Figure 1. Black medick seed in a lentil sample.

Figure 2. Black medick seed (left) and one-seeded pods (right).

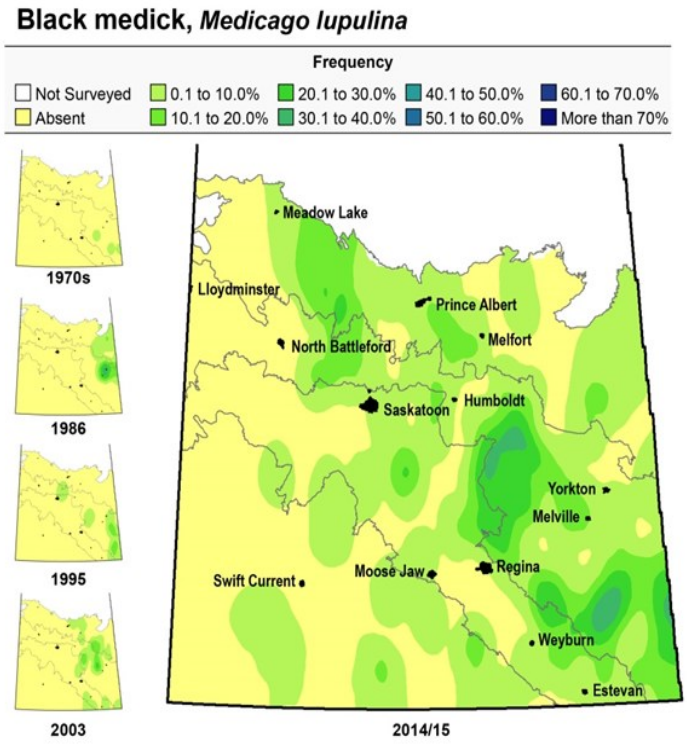
Identification and Biology

Black medick reproduces by seed. The plants have a tap root, are low growing with stems that extend flat to the ground spreading widely, and can be up to 30 inches (.76 metres) long before curving upward to a height of roughly eight inches (20 centimetres). The leaves are three-lobed or trifoliolate, similar to a cloverleaf.

The many small yellow flowers, similar to clover, create a somewhat spherical seed head. The pods are one-seeded, black, and are small at up to three millimetres long and one millimeter wide. The seed inside the black outer pod is oval to kidney-shaped and yellow to olive-green in color (Figure 2). Depending on growing conditions, a single plant can produce up to 6,600 seeds, which can remain viable in the soil for several years.

Most seedlings emerge in the spring, however new seedlings can appear any time during the growing season with the right conditions, and can emerge in the fall as a winter annual. Black medick spreads mostly by seed and likes moisture. As a legume it has the capability to fix its own nitrogen which can enable black medick to have a competitive edge over other crop species in conditions where soils are nutrient poor.

Figure 3. Black medick plant (left) showing yellow flower clusters and close up of developing pod clusters (right).



Survey	Rank	Frequency (%)	Field Uniformity All	Field Uniformity Occurrence	Field Density (#/m²) All	Field Density (#/m²) Occurrence	Field Density (#/m²) High	Relative Abundance
1976-79	109	0.1	< 0.1	23.8	< 0.1	2.2	3.4	< 0.1
1986	29	1.1	0.5	47.1	0.5	43.1	216.4	1.7
1995	73	0.4	< 0.1	6.2	< 0.1	0.3	0.8	0.1
2003	45	1.0	0.2	15.3	< 0.1	2.3	7.8	0.5
2014-15	33	5.0	1.2	24.4	0.2	3.9	88.4	1.9

Figure 4. Black medick distribution map.
Source: *Saskatchewan Weed Survey of Cereal, Oilseed and Pulse Crops in 2014 and 2015. Julia Leeson, AAFC. 2016. pg 322.*

Distribution

In the Saskatchewan Weed Survey of Cereal, Oilseed and Pulse Crops in 2014 and 2015 by Julia Leeson, Agriculture and Agri-Food Canada (AAFC), black medick is ranked as number 33 of 158 weeds in annual crops. Maps of the survey results indicate that the range of black medick as a crop weed is expanding in Saskatchewan (Figure 4). In the 2014/15 survey five per cent of the surveyed fields had black medick, more than in any previous survey. In lentils, black medick was ranked number 26 and is found in 2.8 per cent of lentil fields.

Similar surveys were completed in Manitoba in 2016 and preliminary results show black medick is ranked at number 25 overall. Black medick populations appear to be increasing in Manitoba and Saskatchewan.

Yield Implications and Cropping Considerations

Black medick cannot be controlled selectively with herbicides in the lentil growing year. Therefore, it must be controlled in other crops in rotation, such as in cereals. Controlling black medick two or three years prior to growing a lentil crop or other legume crops is very important. Because of seed dormancy, once black medick is established in a field, it can be difficult to eliminate from the soil seed bank.

There are currently no registered chemical products for control of black medick in grain crops. However, because of the close relationship between black medick and alfalfa, growers may look to products that are registered for volunteer alfalfa control as guidance. It is important to note that as legumes, Medicago species are generally more tolerant to glyphosate than other annual and biennial weed species, so higher glyphosate rates are required to get an acceptable level of control. The Saskatchewan Guide to Crop Protection does list herbicide mixtures that can be used in crop for suppression of black medick.

The biggest concern with black medick found in lentil seed samples has been the misidentification of the seedpods as sclerotia bodies. This has resulted in lentils being downgraded to Sample. If correctly identified as seed pods, the small black medick seed pods are considered dockage and can be easily separated with commercial cleaning. Proper identification of black medick seed pods is very important in determining the correct lentil grade.

As a legume, black medick may be a host for some diseases that attack other legumes. Therefore, it is important to control black medick in non-legume crops to reduce the risk of disease bridging. For more information on how to control black medick in crops, listen to Clark Brenzil, Provincial Specialist, Weed Control with the Saskatchewan Ministry of Agriculture, as he discusses options.

Black Medick as a Cover Crop or Forage in Cropping Systems

Black medick has a history of use as a beneficial cover crop and forage in many parts of the world. As a self-seeding legume cover crop, black medick contributes nitrogen to existing and subsequent crops, provides weed suppression, erosion control, and grazing opportunities in rotation.

In Western Canada, Dr. Martin Entz at the University of Manitoba first began testing black medick for use as a late-season cover crop in the late 1990s, expanding on work started by Dr. Jim Sims, Montana State University in the early 1980s. Conclusions in 2006 showed that black medick significantly increased the nitrogen supply potential of soils by an average of 38 kilograms of nitrogen per hectare, under favourable prairie growing conditions in a flax-wheat-oat rotation. In this situation, farmers using black medick could save 40 to 60 per cent on nitrogen fertilizer costs.

At the AAFC research centre in Indian Head, Bill May is leading a long-term, no-till study initiated in 2002 using black medick as a cover crop with wheat, oats, and flax in rotation to determine the effect of black medick and nitrogen fertilizer at three different rates (20, 60, and 100 per cent of recommended nitrogen) on crop yield and soil nitrogen. Results so far show that applied nitrogen had larger effects than black medick. At lower nitrogen rates of 20 percent, black medick tended to increase yield and quality, and researchers are beginning to see other benefits such as improvements in available phosphorus, and increasing soil microbial diversity. Field observations showed that higher fertilizer rates suppressed the growth of black medick, which may be an option to consider for controlling it as a weed in some crops. Research is continuing, but so far results indicate that including black medick as a cover crop has an advantage in the right fields and stabilizes crop yields at low nitrogen input levels such as in low input or organic production systems.