

## **Management information: *Erodium cicutarium***

### **Cultural:**

Cultural control methods form an important component of this approach. Crop seed rate can be manipulated to suppress *E. cicutarium* and increase yield." Studies find that, *E. cicutarium*' s soil seed bank was reduced from 12,100 to 2,600 seeds/m<sup>2</sup> as wheat seed rate was increased from 50 to 300 kg/ha indicating the benefit of higher wheat seed rates on long-term management of *E. cicutarium*. Further without herbicides or tillage, higher wheat seed rates substantially increased wheat yield and reduced *E. cicutarium* seed production for future infestations. Contaminated grain, hay, straw, manure, and farm machinery are the means through which seed is spread. Farmers are advised to use certified seeds on farmland. and to thoroughly clean machinery in between fields in order to prevent initial infestation. The seeds are also spread by water Trainor, (2001). Growers are advised to plant a crop known to be highly competitive with weeds to suppress *E. cicutarium* growth and reduce potential seed production for future infestations in heavily infested areas. Cereals such as wheat or barley *Hordeum vulgare* L. would be a good choice in western Canada (Blackshaw and Harker, 1998). A study conducted by Kimball and Schiffman (2003) contradict recommendations for the use of cattle grazing to control invasive alien plants and encourage the growth of native species. Their study reports that on their arid California field site *E. cicutarium* was by far the most abundant species, on both the grazed side of the fence and in the area protected from grazing. They conclude that cattle grazing may temporarily reduce some other European species such as *B. madritensis*, but it also reduces native cover and increases the amount of bare ground. This bare ground provides open space for the regeneration of alien plants and highly competitive annual grasses. Similarly, cover of *E. cicutarium* may be significantly enhanced in areas recently cleared by fire (Meyer and Schiffman 1999)

### **Physical:**

Since *E. cicutarium* emerges in early spring, growers may be able to gain control through seedbed tillage operations. If tillage occurred to depths of 5 to 10 cm some seeds would be buried deep enough to reduce ensuing emergence. How long this control strategy is successful depends on length of dormancy and depth and timing of later tillage operations. Since *E. cicutarium* demonstrates poor emergence at soil temperatures of 25 to 30 C, if growers could gain control in early spring they may not see successive flushes of this weed later in the growing season when soil temperatures are usually high."

### **Chemical:**

The Crop Protection Section (1984) states that, "Control of *E. cicutarium* can be achieved by use of 2,4-D or MCPA in cereal crops when applied at the seedling stage." Blackshaw and Harker (1998) report that, "Selective herbicides to control *E. cicutarium* in annual crops are limited. In Canada, no pre-plant or pre-emergence herbicides are registered for *E. cicutarium* control ( Anonymous, 1996), increasing the importance of early post-emergence herbicide applications. Sulphonylurea herbicides such as metsulfuron and thifensulfuron are among the most efficacious herbicides on *E. cicutarium* in cereals ( Anonymous, 1996). Bentazone and imazethapyr provide partial control of *E. cicutarium* in pulses, but unless herbicide-tolerant cultivars are being grown there are no herbicides to control it in oilseed rape. Growers have had some success at controlling initial patches of *E. cicutarium* along field margins with glyphosate and thus limiting its spread over the entire farm. Haar *et al.*, (2003) conducted a study on two new available chemical herbicides that are meant to replace methyl bromide. The authors report that, "Metam sodium reduced the percentage of viable *P. aviculare*, *P. oleracea* and *S. media* seed, but did not affect the viability *E. cicutarium* or *M. parviflora* seed." The authors also make the following statement on another the other chemical: "Seed of *M. parviflora* and *E. cicutarium* was not sensitive dry or wet to chloropicrin." *E. cicutarium* seeds are also known to survive methyl bromide fumigation.

Seed coat hardness and impermeability are thought to be primarily responsible for resistance to fumigation (Haar *et al.*, 2003).