Understanding and Managing Marestail

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A major problem in no-till cropping systems is achieving effective control of marestail (*Conyza canadensis* (L.) Cronq.), also referred to as horseweed. Marestail is a native plant that is considered either a winter or summer annual weed that is often difficult to identify.

Identification and Description
Marestail is a native plant that is considered either a winter or summer annual weed. It is often difficult to identify. Marestail is a dicotlydon plant that has very small round cotyledons as it emerges. The first leaves of marestail are spatulate in shape and have a whorled leaf arrangement to form a rosette. Small plants may be green or purplish in color during periods of cooler weather. The first leaves generally have smooth leaf margin, while later leaves often have and irregular toothed margin. Roots of marestail are fibrous.

After the rosette stage, the marestail will bolt, with a hairy stem. Leaves on the mainstem are alternate, hairy, 1 to 4 inches long, linear to oblanceolate (widest near the leaf apex) in shape, and attached directly to the main stem. Similar to rosette leaves, leaf margins on the mainstem are either entire or toothed. Plants generally reach 3 to 6 ft in height.

Marestail seed heads are arranged in numerous small heads arranged in an elongated panicle. The individual small flowers are generally white in color with the tiny center of the bloom being yellow. Seed are small (about 1/32 inch) and yellow to tan-colored. Attached to the apex of the seed are numerous slender white bristles that form a tuft-like structure that enable wind-aided seed dispersal.

Growth Habit
Marestail is generally considered a winter annual weed, however, marestail can germinate 8 to 9 months out of the year. Depending on geography, marestail will tend to germinate more in the fall in the northern regions of the U.S. and in the spring more in the southern regions. Marestail survival through the winter can range from 20 to 91 percent and vary by rosette size, soil type, and environmental conditions. Since Kansas is in the middle of the U.S., marestail may germinate more in the fall in northern Kansas and spring flushes may be more common in southern Kansas. This can be important when planning for marestail control and herbicide choice. It appears the biology of marestail may be shifting to more spring and summer germination as a result of our cropping systems and herbicide use patterns.

Fall-germinated marestail will overwinter in the rosette stage and bolt in the spring prior to seed production. Spring-germinated marestail will often spend little to no time in the rosette stage, proceeding to the bolted stage soon after emergence.

Marestail can produce up to 200,000 seeds/plant. Because the main mechanism of seed dispersal is by wind movement, its spread can be magnified over great distances. Research has shown that a proportion of marestail seed reaches altitudes in excess of 450 feet above ground. Considering the slow settlement velocity of 1.1ft/sec, a single seed at a 450 ft altitude could easily travel over one hundred miles in a single flight with moderate wind speeds.

Control Options
Marestail is fairly easy to control with many herbicides when plants are small and in the rosette stage of growth. However, when plants begin to bolt or shoot a main stem rapidly in the spring, the ability to get effective control with herbicides is greatly reduced. Therefore timing of control of marestail is critical and, depending on growth stage, herbicide selection will be just as important to achieve successful control.

Since the mid 1990s, marestail has developed herbicide resistance to five herbicide modes of action including glyphosate, paraquat, atrazine, ALS-inhibiting herbicides (i.e. Classic and FirstRate), and diuron across 16 states — including Kansas. With the relative ease of development of herbicide resistance, difficulty in controlling bolted plants, and the widespread dispersal of seed, it is apparent that marestail is a major challenge for no-till soybean producers in Kansas.

Development of glyphosate resistant marestail populations is becoming more common in Kansas. However, management strategies can be implemented to control resistant individuals. A study in Indiana evaluated several practices and their effect on the incidence of resistant individuals in a naturally occurring glyphosate-resistant marestail population. In general, practices that included spring herbicide applications, residual herbicides, herbicides with alternative modes of action to glyphosate, and non-glyphosate postemergence herbicides had the greatest effect of shifting the population from more resistant to more susceptible individuals.

Control in Corn and Sorghum

Fortunately, several options exist to control marestail in reduced or no-till corn and grain sorghum. Atrazine is very effective at controlling marestail both as a preemergence application and when applied to small seedlings. As plants bolt in the spring, control with atrazine begins to decline. Caution on repeated use of atrazine as the sole alternative herbicide needs to be considered since marestail has the ability to develop resistance to this herbicide mode of action. Growth regulator herbicides such as dicamba, 2,4-D, and fluroxypyr (Starane) also are effective for control of marestail and are often tank-mixed with atrazine to provide more consistent control. The HPPD inhibiting (or "bleacher") herbicides such as Lumax, Lexar, Callisto, Balance, Corvus, Capreno, Laudis, and Impact are generally effective for marestail control in corn. Of these, only Lumax and Lexar can be used in sorghum. Lastly, there are several ALS-inhibiting herbicides that have efficacy against marestail for both corn and sorghum, unless the marestail are ALS-resistant.

Control in Wheat

As with corn and sorghum, there are several effective herbicides that control marestail in wheat. Growth regulator herbicides such as dicamba, MCPA, 2,4-D, or fluroxypyr can effectively control marestail in wheat. In addition, several ALS-inhibiting marestail, unless they are resistant to ALS herbicides. Huskie, which is a combination of pyrasulfotole (an HPPD inhibitor) and bromoxynil is also very effective at managing marestail.

Control in Soybean

Controlling marestail in soybeans has been the biggest challenge for central and eastern Kansas no-till producers. Because soybeans are generally planted later in the season, and marestail germinates in the fall or early spring, weed size is the biggest challenge for growers.

In the early spring, using a growth regulator herbicide such as 2,4-D or dicamba is a very inexpensive and effective option to control rosette marestail. In addition, using a herbicide with some residual control will help with those weeds that germinate between the fall/early spring burndown and soybean planting. Products that include Classic, FirstRate, Authority, or Valor should give effective residual control against several broadleaf species including marestail.

As soybean planting nears, marestail control can become difficult because plants will usually be bolted and may have considerable size. Herbicides to apply as a burndown prior to planting include tank mixes of glyphosate with FirstRate, Classic, Sharpen, Optill, or 2,4-D. Be very careful to follow label directions when using 2,4-D prior to soybean planting because the plant-back restriction ahead of soybean can be from 7-30 days. Sharpen is a relatively new herbicide that has provided good marestail control and can be applied any time prior to soybean emergence. Marestail control with Sharpen can be maximized by applying it in combination with methylated seed oil and at spray volumes of 15 gallon per acre or more.

One additional herbicide to consider as a burndown application prior to planting is Ignite, which can provide good to excellent control of marestail. In several K-State studies, Ignite has done well on both rosette and bolted marestail at the 29oz/a rate — and there is no soybean plant-back restriction. Ignite also has broad spectrum non-selective activity on other broadleaf and grass species if treated at a young growth stage. Ignite however is more of a contact herbicide than glyphosate so applications of 15-20 gpa will increase activity. In addition, Ignite tends to work better with higher humidity and warm sunny conditions at application time.

Controlling marestail in the soybean crop with a postemergence applications can be the biggest challenge for producers. Glyphosate alone is often not effective on larger marestail or on glyphosate-resistant marestail. The most successful treatments at controlling large marestail in Roundup Ready Soybeans have been with combinations of glyphosate plus FirstRate, glyphosate plus Classic, or glyphosate plus Synchrony. Another option to control marestail in soybean is to use Liberty Link soybeans. These soybeans are resistant to the herbicide Ignite, which can be a very effective marestail herbicide. Liberty Link soybeans are currently available to producers.