

## ***Milestone® VM Plus Fall Applications for Musk Thistle (Carduus nutans L.) Control***

### *Introduction*

Musk thistle is a biennial noxious herbaceous plant common in Kentucky. Musk thistle typically occurs in pastures, hayfields, roadsides, and other low maintenance areas. In recent history, researchers at the University of Kentucky have examined the efficacy of Milestone VM (a.i. aminopyralid) on several thistle species, including musk and Canada. Results have shown aminopyralid to be successful in controlling thistle species. Research at the University of Kentucky has also shown that the most effective timing application to control biennial species is either in the spring or fall when these plants are in the rosette stage of their life cycle.

Although effective on several species, Milestone VM was shown to be only somewhat effective of several species such as poison hemlock and buckhorn plantain. Milestone VM Plus was introduced into the marketplace in the summer of 2007. The product is a combination of aminopyralid at 0.1 lb a.i. / gal and triclopyr (the a.i. in Garlon 3A) at 1 lb / gal. This combination was done in order to broaden the spectrum of control without having to tank mix 2 separate products. A trial was installed in late October of 2007 to evaluate Milestone VM Plus for late season applications on musk thistle rosettes. This was done to ensure there were no adverse effects (i.e. antagonism) on control levels for musk thistle when aminopyralid and triclopyr were applied together.

### *Methods and Materials*

The trial was located in a cloverleaf at the intersection of I – 265 (Gene Snyder Expressway) and Billtown Rd (exit 19) in Jefferson County, KY. Six herbicide treatments and an untreated check were evaluated in a randomized complete block design with 4 replications (Table 1). Plots, measuring 10' X 30' with a 5' running check in between, were treated at 20 GPA on October 22, 2007 using a CO<sub>2</sub> powered sprayer mounted on an ATV. A 3 day rain event began approximately 30 minutes after application. Plots were evaluated 39 DAT (11/30/2007) and 197 DAT (5/6/2008) to visually estimate percent control of musk thistle. Data were analyzed using ARM software and treatment means were compared using Fisher's LSD at  $p = 0.05$ .

### *Results*

Two treatments, Milestone VM Plus at 8 pt / ac and Milestone VM at 5 fl oz, resulted in greater than 90 % control at 39 DAT (Table 1). These 2 treatments were significantly higher than Milestone VM Plus at the low rate or 4 pt / ac, Garlon 3A at 32 fl oz, and the 2,4-D and Telar tank mix. The 6 pt and 8 pt rates of Milestone VM Plus along with the Milestone at 5 fl oz performed exceptionally well considering the severity and duration of the rain event that occurred immediately after application. The Milestone VM Plus at 6 pt / ac treatment, which is equivalent to Milestone VM at 5 fl oz / ac plus Garlon 3A at 32 fl oz / ac, performed equally as well as the Milestone VM at 5 fl oz / ac treatment.

The low rate of Milestone VM Plus resulted in a higher degree of variance in control levels 39 DAT than the highest rate of Milestone VM Plus tested (Figure 1). Control levels for this treatment ranged from 50 % to 90 % by replication. This shows that more consistent control of musk thistle rosettes early after application (i.e. 39 DAT) is seen with Milestone VM Plus if the rate is kept at 6 pt / ac or above.

The 8 pt rate of Milestone VM Plus and the Milestone VM alone treatment maintained excellent control levels (Table 1) and low degree of treatment variance (Figure 2) through 197 DAT. All Milestone VM Plus and Milestone VM treatments resulted in significantly higher levels of control of musk thistle than Garlon 3A alone or 2,4-D amine plus Telar the following growing season after application.

Overall results of this trial indicate that higher rates of Milestone VM Plus (8 pt / ac) and Milestone VM at 5 fl oz / ac, when applied in the fall, can result in excellent musk thistle control the following growing season.

*Table 1: Treatments and results for the Milestone VM Plus / Musk Thistle trial*

Treatment	Rate per acre	Tank mix equivalent	Tank mix equivalent rate per acre	Percent Control 39 DAT	Percent Control 197 DAT
Milestone VM Plus	4 pt	Milestone VM + Garlon 3A	3 fl oz + 21 fl oz	74 b	84 a
Milestone VM Plus	6 pt	Milestone VM + Garlon 3A	5 fl oz + 32 fl oz	89 ab	82 a
Milestone VM Plus	8 pt	Milestone VM + Garlon 3A	6.4 fl oz + 42 fl oz	93 a	98 a
Milestone VM	5 fl oz	n/a	n/a	90 a	96 a
Garlon 3A	32 fl oz	n/a	n/a	35 c	18 b
2,4-D amine + Telar	32 fl oz + 0.25 oz	n/a	n/a	31 c	8 b
Untreated	n/a	n/a	n/a	0	0

*Note: Treatment means followed by the same letter are not significantly different using Fisher's LSD at  $p = 0.05$ . All treatments included a non-ionic surfactant at 0.25 % v/v.*

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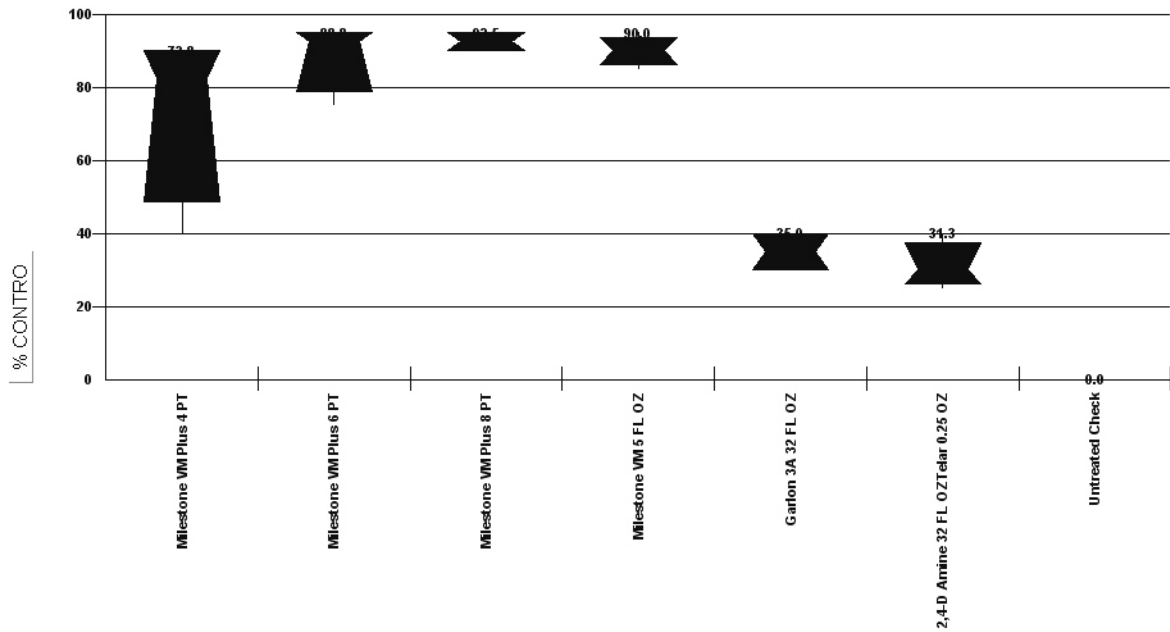


Figure 1: Box Whisker Plot for Treatment Variance 39 DAT

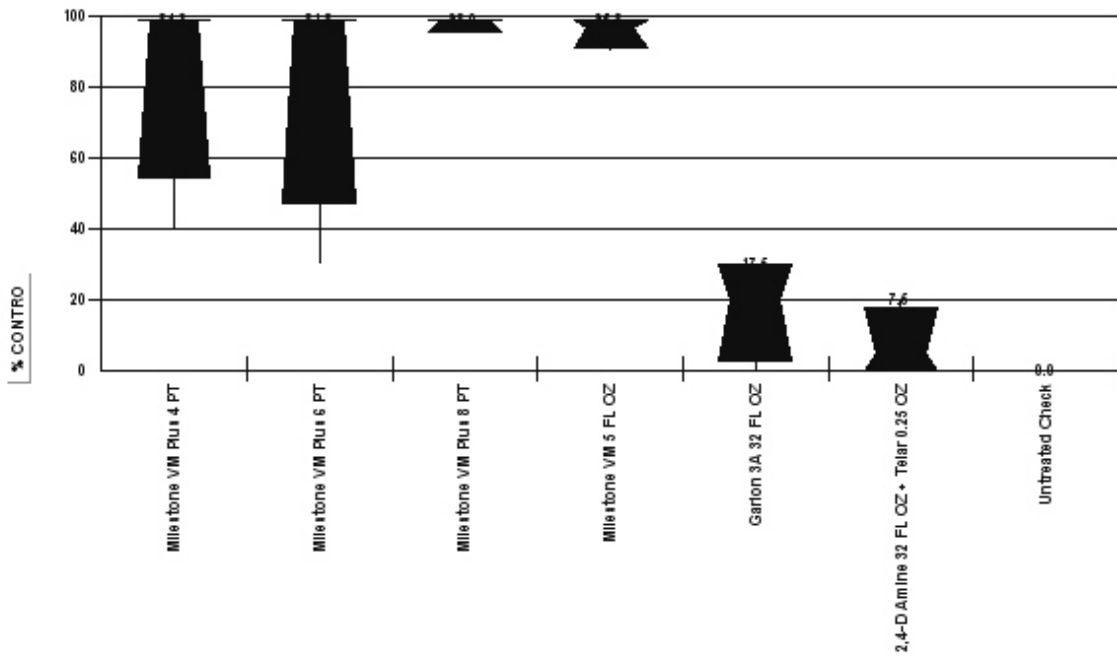


Figure 2: Box Whisker Plot for Treatment Variance 197 DAT