# Toolbox: Milestone™ Aminopyralid

By Joseph M. DiTomaso and Guy B. Kyser
University of California at Davis

*TOOLBOX highlights new tools that might integrate well into local weed management tool boxes. The* Noxious Times *does not specifically endorse tools featured, but rather strives to provide information that will lend itself to further examination and research on the part of the consumer.*

Milestone™ (aminopyralid) is a new systemic herbicide developed by Dow AgroSciences registered in California at the end of 2006. It is in the picolinic acid family of herbicides, as are Transline® (clopyralid), Garlon® (triclopyr) and Tordon® (picloram). These compounds mimic naturally occurring auxins, a class of growth regulators that are involved in cell division, differentiation and growth. Milestone™ is a broadleaf-specific herbicide that primarily targets the control of noxious and invasive weeds on rangeland, pasture, Conservation Reserve Program acres, non-cropland areas such as roadsides, non-irrigation ditch banks, natural areas (such as wildlife management areas, wildlife openings, wildlife habitats, recreation areas, campgrounds, trailheads and trails), and grazed areas in and around these sites.

The herbicide is a liquid salt formulation containing 2 lbs/gal of aminopyralid. The registered use rate of the product ranges between 3 oz/A (0.75 oz ae/A) and 7 oz/A (1.75 oz ae/A). Like Transline®, there are no grazing restrictions with its use. In addition, it can be applied to the edge of waterways, which provides an advantage over Transline® when controlling invasives near streams, canals or lakes.

The active ingredient of Milestone™, aminopyralid, has a very favorable toxicity profile, with no evidence of teratogenicity, mutagenicity, carcinogenicity, or adverse endocrine and reproductive effects. Tests also show low acute and chronic toxicity to mammals, birds, fish, and aquatic invertebrates. As a result, it was registered by the United States EPA through the reduced risk program. Aminopyralid also has a very favorable environmental fate because of its relatively rapid degradation in soil (half life of 34 days). Field experiments showed limited movement in the soil profile and EPA models demonstrated a low potential for groundwater concentration.

Like Transline®, Milestone™ has both postemergence and preemergence activity on many established broadleaf plants and provides season-long residual control of germinating seeds of susceptible plants. While nearly all warm- and cool-season rangeland and pasture grasses are tolerant of Milestone™, invasive knapweeds and thistles and other species in the sunflower family, as well as legumes, solanaceous weeds (such as tropical soda apple *Solanum viarum*), and a few other invasive broadleaf species are very susceptible (Table 1). Other species, including *Leucanthemum vulgare* (oxeye daisy), *Onopordum acanthium* (Scotch thistle), *Silybum marianum* (milk thistle), *Chondrilla juncea* (rush skeletonweed), and *Rumex crispus* (curly dock) are being tested or have been observed to be sensitive to the herbicide.

A= acre
ae= acid equivalency

Table 1. Invasive plants controlled by Milestone™ with effective rates.

| Invasive Thistles and Teasel | Rates (oz product/acre) |
|---|---|
| Acroptilon repens (Russian knapweed) | 5-7 oz |
| Carduus nutans (musk thistle) | 3-5 oz |
| Carduus pycnocephalus (Italian thistle) | 7 oz |
| Centaurea biebersteinii; =C. maculosa; =C. stoebe (spotted knapweed) | 5-7 oz |
| Centaurea calcitrapa (purple starthistle) | 3-5 oz |
| Centaurea diffusa (diffuse knapweed) | 5-7 oz |
| Centaurea melitensis (tocalote) | 3-4 oz |
| Centaurea solstitialis (yellow starthistle) | 3-4 oz |
| Cirsium arvense (Canada thistle) | 5-7 oz |
| Cirsium vulgare (bull thistle) | 3-4 oz |
| Cynara cardunculus (artichoke thistle) | 5-7 oz |
| Dipsacus spp. (teasel) | 4-7 oz |

The primary target for Milestone™ in California is yellow starthistle. Results of studies conducted in Oregon, Washington, Idaho and California show that a treatment of Milestone™ in winter to early spring provides excellent control of yellow starthistle at the lowest registered rate of 3 oz product/A. However, Milestone™ was not as effective as Transline® when plants were treated in the bolting stage. The optimal timing for yellow starthistle control at 3 oz product/A was between December and February.

In conclusion, Milestone™ will play a key role in the management and eradication of important invasive species in California, particularly the invasive thistles and knapweeds. Its activity on yellow starthistle is about three times that of Transline® and it also shows good activity at low rates on several other important weeds. Furthermore, it promises to be a more affordable option in the control of some of the state's most invasive species. ❖