

# What's Cropping Up?

A NEWSLETTER FOR NEW YORK FIELD CROPS & SOILS

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Spotted knapweed and brown knapweed are increasingly problematic in pastures, grass hayfields, and along roadsides throughout the Northeast. Both were introduced from Europe and one of them, spotted knapweed, was placed on the "Primary List

of Invasive Plants in NYS" by the Invasive Plant Council of NYS. They are members of the Compositae family and both have pink to purple flowers that appear in July and August. Spotted knapweed is classified as a biennial or short-lived perennial forming a basal rosette in the first year. Brown knapweed is a perennial that reproduces/spreads by seed only.

## New Herbicide Has Reduced Risk

Commonly used broadleaf herbicides, like 2,4-D and Banvel/Clarity (dicamba), have

## Knapweeds Controlled in Pastures and Grass Hayfields with New Herbicide

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not been effective against the knapweeds in pastures and grass hayfields, however a new herbicide does show promise in these situations. The herbicide, Milestone (aminopyralid) has the same site-of-action classification (Group 4 – synthetic auxins/growth regu-

lators) as 2,4-D and Banvel/Clarity but is from a different chemical family, the pyridine carboxylic acids. Aminopyralid, the active ingredient in Milestone, was accepted for evaluation under U.S. EPA's Reduced Risk Pesticide program in October 2004. This program was established to encourage development and use of lower risk pesticides by expediting the review of new active ingredients that meet EPA's reduced risk criteria. A reduced risk pesticide is defined as one which "may reasonably be expected to accomplish one or more of the following":

Table 1. Spotted knapweed and smooth bedstraw control in a grass pasture in Onondaga County, NY n 2005.

| Herbicides*   | Amount/<br>Acre | % Control 140 DAT |          |
|---------------|-----------------|-------------------|----------|
|               |                 | Knapweed          | Bedstraw |
| Milestone     | 4 fl oz         | 50                | 96       |
| Forefront R&P | 1.5 pt          | 85                | 99       |
| Forefront R&P | 2 pt            | 97                | 99       |
| 2,4-D Ester   | 2 pt            | 47                | 2        |
| 2,4-D Ester   | 3 pt            | 45                | 8        |
| Clarity       | 1 pt            | 27                | 16       |
| Weedmaster    | 2 pt            | 40                | 15       |
| LSD (0.05)    |                 | 9                 | 19       |

\* Applied in 20 gpa of water with 0.25% (v/v) of Activator 90 non-ionic surfactant.

## Weed Management

- 1) reduce pesticide risks to human health;
- 2) reduce pesticide risks to non-target organisms;
- 3) reduce the potential for contamination of valued environmental resources, or

3) When compared to the registered alternative products, aminopyralid also reduces the potential for contamination of ground and surface water resources and risk to non-target organisms, including both acute and chronic risk to mammals, birds, algae and aquatic vascular plants.

| Table 2. Brown knapweed and smooth bedstraw control in a grass hayfield in Albany County, NY in 2006. |                 |                  |          |
|-------------------------------------------------------------------------------------------------------|-----------------|------------------|----------|
| Herbicides*                                                                                           | Amount/<br>Acre | % Control 71 DAT |          |
|                                                                                                       |                 | Knapweed         | Bedstraw |
| Milestone                                                                                             | 4 fl oz         | 99               | 99       |
| Forefront R&P                                                                                         | 1.5 pt          | 99               | 99       |
| Forefront R&P                                                                                         | 2 pt            | 99               | 99       |
| 2,4-D Amine                                                                                           | 2 pt            | 15               | 17       |
| 2,4-D Amine                                                                                           | 4 pt            | 30               | 17       |
| 2,4-D Ester                                                                                           | 2 pt            | 27               | 20       |
| Clarity                                                                                               | 1 pt            | 19               | 20       |
| 2,4-D Amine                                                                                           | 2 pt            | 27               | 27       |
| + Clarity                                                                                             | 1 pt            |                  |          |
| LSD (0.05)                                                                                            |                 | 5                | 4        |
| * Applied in 20 gpa of water with 0.25% (v/v) of Activator 90 non-ionic surfactant.                   |                 |                  |          |

- 4) increase adoption of Integrated Pest Management (IPM) or make it more effective.

Aminopyralid was accepted into this Reduced Risk Program based, in part, on:

- 1) Aminopyralid's very favorable toxicity profile compared to market standards, with no evidence of teratogenicity, mutagenicity, carcinogenicity, endocrine or adverse reproductive effects.

- 2) Because of its excellent toxicity profile, when compared to the market standards, aminopyralid was also recognized as reducing potential risk to applicators and overall dietary risk to the general population.

- 4) Aminopyralid was recognized by EPA as broadening the adoption of IPM, both by providing improved control of many invasive weeds and as a result of its' low use rate, effecting a significant reduction of the total environmental load of herbicides.

Registration of Milestone in NY State is pending.

### Spotted Knapweed

Research in NY State with aminopyralid was initiated in 2005. An experiment was established in Onondaga County in an extensively managed pasture with a good infestation of spotted knapweed. Herbicides were applied in 20 gallons per

## Weed Management

acre (gpa) of water with 0.25% (v/v) non-ionic surfactant on May 31, 2005 when the knapweed was about 18 inches tall. Control ratings were made 48 and 140 days after treatment (DAT). In addition to spotted knapweed, a moderate infestation of smooth bedstraw allowed an evaluation of the herbicides for that common perennial weed as well.

Control ratings for these weeds are shown in Table 1 for evaluations made 140 DAT. Although the 4 fl oz/A rate of Milestone did not control spotted knapweed all that well (50%), it should be noted that the label recommends 5 to 7 fl oz/A of Milestone for spotted knapweed control. Forefront R&P (a premix of Milestone and 2,4-D) at 1.5 pt/A provided 85% control of this biennial weed. The 1.5 pt/A rate of Forefront R&P includes aminopyralid equivalent to 4 fl oz/A of Milestone. At 2 pt/A of Forefront R&P, knapweed control improved to 97% which is equivalent to the 5 fl oz/A rate of Milestone. By comparison, the 2,4-D treatments and Clarity provided about 45 and 27% spotted knapweed control respectively, while Weedmaster (a premix of 2,4-D and dicamba) provided 40% control. In addition, the 4 fl oz/A rate of Milestone and the 1.5 pt/A rate of Forefront R&P provided excellent (95%+) smooth bedstraw control while 2,4-D, Clarity, and Weedmaster each controlled less than 20% of the bedstraw.

### Brown Knapweed

A second experiment with Milestone and Forefront R&P was established in Albany County on May 24, 2006 in a grass hayfield with good infestations of brown knapweed and smooth bedstraw. Again, herbicides were applied in 20 gpa of water with 0.25% (v/v) non-ionic surfactant. Knapweed was about 10 inches tall when

herbicides were applied. Weed control ratings were made 35 and 71 DAT.

Ratings made 71 DAT (Table 2) suggest that brown knapweed may be more sensitive to Milestone than spotted knapweed. As little as 4 fl oz/A of Milestone provided 99% control of this perennial knapweed. The Forefront R&P premix at 1.5 pt/A also provided excellent (99%) control. Once again, standard pasture herbicides, 2,4-D and Clarity did not provide acceptable control. Less than 20% of the knapweed was controlled with 2 pt/A of 2,4-D Amine (Amine 4 2,4-D Weed Killer) or 1 pt/A of Clarity, while 2 pt/A of 2,4-D Ester (Low Vol 4 Ester Weed Killer) and the tank mix of 2 pt/A of 2,4-D Amine plus 1 pt/A Clarity controlled about 27% of the knapweed. All treatments that included the active ingredient in Milestone provided excellent bedstraw control while the other herbicides had little impact on this weed.

### Restrictions

Although there are crop rotation restrictions for both Milestone and Forefront R&P, there are no restrictions on grazing or hay harvest following application of Milestone at labeled rates. Since Forefront R&P is a mixture of aminopyralid and 2,4-D, there is a 7 day harvesting restriction on hay. Livestock urine and manure may contain enough aminopyralid to injure sensitive broadleaf plants. As a result, grazing animals should not be moved from areas treated with either product to areas with sensitive broadleaf crops without allowing 3 days of grazing on an untreated pasture.

## Crop Management

### Successfully Using the Number of Growing Degree Days from the Tassel/Silking Date to Predict When to Begin Corn Silage Harvest in 2006

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A challenge each year is to determine when to begin corn silage harvest. In the last issue of *What's Cropping Up?*, we reported the number of GDD from the tassel/silking date to the silage harvest date, typically at 68-69% moisture in our corn silage hybrid trials at the Aurora Research Farm, in 2003, 2004, and 2005 (Table 1). We predicted, based on the data from previous years, that 95-100 day hybrids should be below 70% moisture at about 750 GDD after the tassel/silking date as long as there weren't any precipitation events in excess of 1.00 inches within a few days of harvest. We used this method this year when we harvested our 95-100 day hybrids on August 24<sup>th</sup>, despite the early date, somewhat green color of the hybrids, and a 0.80 inch precipitation on August 20<sup>th</sup>.

Table 2 lists the 20 hybrids that were harvested along with their tassel/silking dates, GDDs from planting to tassel/silking, days from tassel/silking

to silage harvest, and accumulated GDDs from tassel/silking to silage harvest. To be truthful with you, many of the hybrids looked somewhat green and their moisture samples felt somewhat wet at harvest. Nevertheless, all but two of the 20 hybrids had moistures less than 70%. When averaged across the 20 hybrids, the moisture at harvest was 68.4% with 36.7 calendar days and 774 GDDs from tassel/silking date to silage harvest. In other words, our prediction was right on the money.

In examining the individual hybrids, however, we note that the range in calendar days from tassel silking was from 34 to 38 days, the range in accumulated GDD from tassel/silking was 705 to 807 GDD, and the range in silage moisture was from 66.9 to 70.7%. If we correlate the accumulated GDD from tassel/silking with silage moisture %, the value is somewhat low ( $r=0.62$ ). In other words, the use of GDD from

Table 1. Tassel/silking dates, silage harvest dates, and number of calendar and growing degree days (GDD) between the two dates for 96-100, 101-105, 106-110, and 111-115 day hybrids planted in late April of 2003, 2004, and 2005 at the Aurora Research Farm.

| Hybrid Maturity Group | Tassel/Silk | GDD   | Silage Harvest | Days | GDD  |
|-----------------------|-------------|-------|----------------|------|------|
| Relative Maturity     |             | °F    | Date           |      | °F   |
| <u>2003</u>           |             |       |                |      |      |
| 96-100                | 7/24        | ~1250 | 8/28           | 35   | ~775 |
| 101-105               | 7/27        | ~1300 | 9/5            | 40   | ~850 |
| 106-110               | 7/29        | ~1340 | 9/9            | 42   | ~850 |
| 111-115               | 7/31        | ~1380 | 9/11           | 43   | ~850 |
| <u>2004</u>           |             |       |                |      |      |
| 96-100                | 7/20        | ~1250 | 8/31           | 42   | ~725 |
| 101-105               | 7/22        | ~1300 | 9/3            | 43   | ~750 |
| 106-110               | 7/23        | ~1330 | 9/5            | 44   | ~775 |
| 111-115               | 7/24        | ~1350 | 9/7            | 45   | ~800 |
| <u>2005</u>           |             |       |                |      |      |
| 96-100                | 7/17        | ~1285 | 8/18           | 31   | ~780 |
| 101-105               | 7/19        | ~1330 | 8/22           | 34   | ~815 |
| 106-110               | 7/21        | ~1370 | 8/25           | 35   | ~810 |
| 111-115               | 7/22        | ~1405 | 8/26           | 35   | ~810 |

tassel/silking was not too accurate in improving the prediction of the exact moisture of corn silage at harvest within this 95-100 day hybrid set.

We recommend that the use of GDD from the tassel/silking date be used as a guide in deciding when to begin corn silage harvest. We recommend that silage producers begin

opening up their fields at about 750 GDD after the tassel/silking dates (rural weather stations and not urban weather stations, such as airports, should be used for the calculation of GDD) and to test for moisture. We are fairly confident that unless there was a significant precipitation event a couple days earlier corn silage harvest should commence shortly thereafter.

Table 2. Tassel/silking dates, growing degree days (GDD) to tassel/silking, number of calendar days and accumulated GDDs from the tassel silking date to silage harvest date, the silage harvest date, and % moisture of 20 hybrids harvested on 8/24/06 at the Aurora Research Farm.

| Hybrid    | RM  | Tassel/Silk | GDD <sup>†</sup> | Days | GDD <sup>‡</sup> | % Moisture |
|-----------|-----|-------------|------------------|------|------------------|------------|
| HL SR42   | 94  | 7/17        | 1241             | 38   | 807              | 69.5       |
| HL S041   | 95  | 7/18        | 1264             | 37   | 784              | 69.1       |
| HL S047   | 98  | 7/19        | 1290             | 36   | 758              | 68.4       |
| 38H67     | 97  | 7/17        | 1241             | 38   | 807              | 67.7       |
| 38H65     | 99  | 7/17        | 1241             | 38   | 807              | 67.5       |
| 37K87     | 100 | 7/17        | 1241             | 38   | 807              | 66.9       |
| 37K84     | 100 | 7/18        | 1264             | 37   | 784              | 67.6       |
| 468RB     | 94  | 7/18        | 1264             | 37   | 784              | 68.4       |
| 470RR     | 99  | 7/18        | 1264             | 37   | 784              | 67.5       |
| N45-A6    | 100 | 7/18        | 1264             | 37   | 784              | 67.8       |
| 8676IT    | 100 | 7/19        | 1290             | 36   | 758              | 68.7       |
| 8688RR    | 100 | 7/19        | 1290             | 36   | 758              | 70.1       |
| TMF94     | 96  | 7/18        | 1264             | 37   | 784              | 68.9       |
| TMF 2N422 | 95  | 7/19        | 1290             | 36   | 758              | 67.9       |
| TMF T497  | 100 | 7/21        | 1343             | 34   | 705              | 68.9       |
| 4955XRR   | 99  | 7/19        | 1290             | 36   | 758              | 68.2       |
| 54B77     | 98  | 7/18        | 1264             | 37   | 784              | 68.7       |
| 946LRR    | 94  | 7/19        | 1290             | 36   | 750              | 67.8       |
| 964L      | 96  | 7/20        | 1317             | 35   | 731              | 68.3       |
| UF0996B   | 97  | 7/18        | 1264             | 37   | 684              | 70.7       |

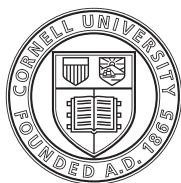
<sup>†</sup> GDD from planting (4/28) until silage harvest (8/24).

<sup>‡</sup> GDD from silking to silage harvest.

## Calendar of Events

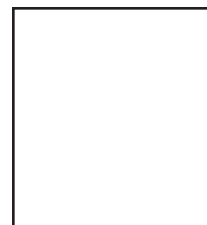
|                     |                                                                                  |
|---------------------|----------------------------------------------------------------------------------|
| Oct. 24, 2006       | Field Crop Dealer Meeting, Comfort Suites, 7 Northside Drive, Clifton Park, NY   |
| Oct. 25, 2006       | Field Crop Dealer Meeting, Holiday Inn, 1777 Burrstone Road, New Hartford, NY    |
| Oct. 26, 2006       | Field Crop Dealer Meeting, Batavia Party House, 5762 East Main Road, Batavia, NY |
| Oct. 27, 2006       | Field Crop Dealer Meeting, Auburn Holiday Inn, 75 North Street, Auburn, NY       |
| Nov. 7-9, 2006      | NE Division of the American Phytopathological Society, Burlington, VT            |
| Nov. 12-16, 2006    | American Society of Agronomy Meetings, Indianapolis, IN                          |
| Nov. 29-Dec.1, 2006 | National Soybean Rust Symposium, St. Louis, MO                                   |
| Dec. 5-7, 2006      | NE Region Certified Crop Advisor Conference, Holiday Inn, Waterloo, NY           |
| Dec. 10-12, 2006    | National Fusarium Head Blight Forum, Raleigh, NC                                 |

*What's Cropping Up?* is a bimonthly newsletter distributed by the Crop and Soil Sciences Department at Cornell University. The purpose of the newsletter is to provide timely information on field crop production and environmental issues as it relates to New York agriculture. Articles are regularly contributed by the following Departments at Cornell University: Crop and Soil Sciences, Plant Breeding, Plant Pathology, and Entomology. **To get on the mailing list, send your name and address to Pam Kline, 234 Emerson Hall, Cornell University, Ithaca, NY 14853.**



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