

**1991 TURF WEED CONTROL AND PGR UPDATE**  
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**EVALUATION OF PESTICIDE TREATED GRASS CLIPPINGS FOR  
MULCH AND COMPOST**

The public concern over pesticide use has raised many questions, some that are not legitimate but others that need to be addressed. In 1991, a project funded by DowElanco, was initiated to examine the persistence of pesticide residues on turfgrass clippings used for compost, and to determine the potential for pesticide residues to injure ornamental and vegetable plantings when pesticide treated grass clippings are used as a mulch. The compost study involves repeated sampling over a one year period, and those results will not be available until the late summer of 1992. However, data on the impact of pesticide treated grass clippings used as a mulch was collected during 1991 for 2 ornamental and 2 vegetable species. The species selected were petunias, impatiens, tomatoes, and dwarf horticultural beans. The horticultural beans and tomatoes were established from seed, while the other two species were transplanted. The garden plot area was established on May 28, 1991 at the Hancock Turfgrass Research Center on the MSU campus. Good management practices were followed to ensure good quality plants. An old, unirrigated stand of predominantly Kentucky bluegrass turf was chosen to receive the pesticide treatments. Pesticides used were Dursban 4E @ 1 oz/M, Turflon II amine @ 1 oz/M, Confront @ 0.74 oz/M, Cutless @ 1.5 lbs/A, and Gallery 75 DF @1.0 lbs/A. The pesticide treatments were applied on 6/12/91 and only the Gallery treatment received post application irrigation. Clippings were harvested at 2, 8, and 14 days after treatment (DAT). Immediately after collection, the clippings were used to mulch each species listed above. Data were collected weekly using a visual scale of 0-100 to evaluate injury with 100 indicating a dead plant.

The results indicated that herbicide and plant growth regulator treated grass clippings can cause serious injury or death to young plants (Tables 1-4). As would be expected, clippings which had residues of postemergence broadleaf herbicides were the most injurious of the pesticide products tested. Confront treated clippings, when harvested and mulched at 2 DAT, killed all four species tested and was overall the most injurious pesticide tested. Even clippings taken 14 DAT, which was the third mowing following treatment, caused injury ratings of near 50 for tomatoes and horticultural beans. Turflon II amine was not as injurious as Confront when compared across all species. Surprisingly, Gallery, a preemergence broadleaf herbicide, caused considerable injury to tomatoes and moderate injury to horticultural beans and impatiens. This was unexpected since the tomatoes and impatiens were transplanted and not started from seed. As was expected, the plant growth regulator Cutless caused considerable stunting and some injury to impatiens, tomatoes, and horticultural beans.

This research will be expanded in 1992 to include more pesticide products, although several important points can be learned from the research conducted in 1991. Any grass clippings used as a mulch that have been treated with a herbicide or plant growth regulator could cause serious injury or death to ornamental plants. At least two, and perhaps three mowings should be returned to the turf before using herbicide or plant growth regulator treated clippings as a mulch. Clippings treated with a fungicide or insecticide should not cause injury to ornamental plants.

## PREEMERGENCE HERBICIDE EVALUATIONS

The 1991 grass preemergence trial was conducted at the Hancock Turfgrass Research Center (Table 5). We examined the efficacy of Dimension granular herbicide when different percentages of active ingredient on the granule were used. As the percentage of active ingredient on the granule was decreased, better crabgrass control was obtained. Potentially lower herbicide rates may be possible by using these lower AI granules. The savings in herbicide must be balanced by the increased cost of shipping and handling the extra inert material. Another interesting observation from this trial was the activity of Gallery as a preemergence grass herbicide. Gallery is a new class of herbicide for use on turf that controls a wide spectrum of broadleaf weeds preemergence. However, as the rate of Gallery 75 DF was increased from 0.75 to 1.5 lbs AI/A, fairly good crabgrass control was achieved with only 6% crabgrass in the plots receiving the 1.5 lb rate. This level of control compared quite favorably with the 3.0 lb AI/A rate of pendimethalin (PreM) which had 7% crabgrass.

## POSTEMERGENCE HERBICIDE EVALUATIONS

Considerable effort was focused on postemergence crabgrass control during 1991. Testing in 1991 focused on combinations of pre and postemergence herbicides and on Dimension plus adjuvants. Early season postemergence treatments were applied on May 31 to crabgrass in the 2-3 leaf stage (Table 6). Combinations of BAS 514 (proposed trade name Drive from BASF) with PreM gave complete crabgrass control at 4 weeks after treatment (WAT) and excellent control through 9 WAT. Combinations of prodiamine (proposed trade name Barricade from Sandoz) with Acclaim also provided excellent control through 9 WAT. Dimension, listed in Table 6 as MON-15104, performance was variable and dependent upon the adjuvant that was applied with it. The MON-15104 is a vegetable oil formulation that will not be the commercial product, rather the commercial product will be an emulsifiable concentrate. When MON-15104 was applied alone, a maximum of 81% control was observed at 4 WAT, but this control fell off to 44% at 9 WAT. Other adjuvants such as Dow Corning 6955-145, when added to MON-15104, resulted in excellent crabgrass control throughout the 9 week evaluation period (Table 6).

The mid-season postemergence crabgrass trial was initiated on July 3rd when crabgrass was at the 2-3 tiller growth stage. As the plants become more mature, the crabgrass is more difficult to control and this is apparent when comparing percent control in Tables 6 and 7. This trial was compromised by the fact that a brief but intense rain shower occurred 4 hours after applications were completed. Some of the difference in performance may be due to the fact that some treatments were washed off the leaf before complete herbicide absorption had occurred.

At this growth stage, only the single isomer of Acclaim (experimental designation HOE 46360-18H) provided 100% control at 4 WAT. The BAS 514 plus PreM treatments performed well, but not as consistently as the earlier treatments. The Dimension treatments were again quite variable, depending upon which adjuvants were added to the spray solution. The treatments designated MON-15151 represent the emulsifiable formulation of Dimension, which will be the commercial product. As some of these adjuvants are experimental and therefore not available to the end-user, the adjuvant X-77 seemed to perform well with both Dimension formulations and is commercially available. This would be a good choice for turf managers to use when using Dimension in a postemergence situation.

Why does Dimension perform so much better with an adjuvant? This question was examined in detail by Steve Keeley during his MS research, which was reported upon in the proceedings from the 1991 and 1990 conferences. We concluded that Dimension is not very mobile in plants, and that

TABLE 1 - MULCHING ORNAMENTAL PLANTS WITH TREATED TURFGRASS CLIPPINGS

TOMATO PLANT QUALITY (0-100)<sup>1</sup>

TREATMENTS TO TURF <sup>2</sup>	DATE OF MULCHING <sup>3</sup>	6/20	6/24	6/27	7/2	7/9	7/12	8/6
UNTREATED CONTROL	6/14/91	3	5	10	0	3	7	0
UNTREATED CONTROL	6/20/91	NA	3	3	3	7	10	0
UNTREATED CONTROL	6/26/91	NA	NA	0	0	0	10	0
DURSBAN 4E	6/14/91	0	8	0	0	0	3	0
DURSBAN 4E	6/20/91	NA	16	3	0	0	16	0
DURSBAN 4E	6/26/91	NA	NA	0	0	3	7	0
TURFLON II AMINE	6/14/91	68	63	81	94	100	100	100
TURFLON II AMINE	6/20/91	NA	33	7	29	13	40	0
TURFLON II AMINE	6/26/91	NA	NA	0	7	0	7	0
CONFRONT	6/14/91	81	90	99	100	100	100	100
CONFRONT	6/20/91	NA	60	70	73	89	92	93
CONFRONT	6/26/91	NA	NA	16	30	39	36	49
GALLERY 75DF	6/14/91	13	60	71	76	77	80	67
GALLERY 75DF	6/20/91	NA	23	26	48	55	55	33
GALLERY 75DF	6/26/91	NA	NA	0	3	16	13	0
CUTLESS 50W	6/14/91	0	11	3	40	26	39	28
CUTLESS 50W	6/20/91	NA	15	3	23	23	46	20
CUTLESS 50W	6/26/91	NA	NA	2	3	10	18	0
<b>LSD (P=0.05)</b>		<b>8.2</b>	<b>12.7</b>	<b>12.7</b>	<b>14.1</b>	<b>14.6</b>	<b>14.8</b>	<b>15.7</b>

<sup>1</sup> Rating system is a progressive scale ranging from 0=No Injury and 100=Completely dead

<sup>2</sup> Treatments were applied to 2000ft<sup>2</sup> of low maintenance turf on 6/12/91

<sup>3</sup> 6/14/91, 6/20/91 and 6/26/91 are the 1st, 2nd and 3rd mowings respectively, and they correspond with 2 days after treatment, 8 days after treatment and 2 weeks after treatment

TABLE 2 - MULCHING ORNAMENTAL PLANTS WITH TREATED TURFGRASS CLIPPINGS

IMPATIEN PLANT QUALITY (0-100)<sup>1</sup>

TREATMENTS TO TURF <sup>2</sup>	DATE OF MULCHING <sup>3</sup>	6/20	6/24	6/27	7/2	7/9	7/12	8/6
UNTREATED CONTROL	6/14/91	0	5	3	3	3	7	0
UNTREATED CONTROL	6/20/91	NA	7	0	7	7	6	0
UNTREATED CONTROL	6/26/91	NA	NA	6	10	10	13	0
DURSBAN 4E	6/14/91	0	0	0	3	10	7	0
DURSBAN 4E	6/20/91	NA	0	0	0	10	7	0
DURSBAN 4E	6/26/91	NA	NA	7	3	13	11	0
TURFLON II AMINE	6/14/91	10	3	6	13	10	10	0
TURFLON II AMINE	6/20/91	NA	0	23	16	13	10	7
TURFLON II AMINE	6/26/91	NA	NA	7	7	10	20	0
CONFRONT	6/14/91	56	61	79	76	83	83	100
CONFRONT	6/20/91	NA	10	23	33	33	35	45
CONFRONT	6/26/91	NA	NA	7	15	19	23	17
GALLERY 75DF	6/14/91	7	13	13	16	30	26	17
GALLERY 75DF	6/20/91	NA	3	0	12	16	16	7
GALLERY 75DF	6/26/91	NA	NA	10	7	10	10	0
CUTLESS 50W	6/14/91	7	10	0	20	23	24	30
CUTLESS 50W	6/20/91	NA	6	3	20	16	18	0
CUTLESS 50W	6/26/91	NA	NA	0	12	10	15	0
<b>LSD (P=0.05)</b>		<b>8.2</b>	<b>12.7</b>	<b>12.7</b>	<b>14.1</b>	<b>14.6</b>	<b>14.8</b>	<b>15.7</b>

<sup>1</sup> Rating system is a progressive scale ranging from 0=No Injury and 100=Completely dead

<sup>2</sup> Treatments were applied to 2000ft<sup>2</sup> of low maintenance turf on 6/12/91

<sup>3</sup> 6/14/91, 6/20/91 and 6/26/91 are the 1st, 2nd and 3rd mowings respectively, and they correspond with 2 days after treatment, 8 days after treatment and 2 weeks after treatment

**TABLE 3 - MULCHING ORNAMENTAL PLANTS WITH TREATED TURFGRASS CLIPPINGS**

**PETUNIA PLANT QUALITY (0-100)<sup>1</sup>**

<b>TREATMENTS TO TURF<sup>2</sup></b>	<b>DATE OF MULCHING<sup>3</sup></b>	<b>6/20</b>	<b>6/24</b>	<b>6/27</b>	<b>7/2</b>	<b>7/9</b>	<b>7/12</b>	<b>8/6</b>
UNTREATED CONTROL	6/14/91	3	0	0	0	0	0	10
UNTREATED CONTROL	6/20/91	NA	0	0	0	0	0	0
UNTREATED CONTROL	6/26/91	NA	NA	0	0	3	5	0
DURSBAN 4E	6/14/91	2	3	0	0	0	0	0
DURSBAN 4E	6/20/91	NA	0	0	0	0	8	0
DURSBAN 4E	6/26/91	NA	NA	0	3	0	3	0
TURFLON II AMINE	6/14/91	13	29	19	26	100	100	100
TURFLON II AMINE	6/20/91	NA	20	17	17	35	40	0
TURFLON II AMINE	6/26/91	NA	NA	0	0	0	0	0
CONFRONT	6/14/91	10	19	16	26	79	93	100
CONFRONT	6/20/91	NA	3	3	12	10	18	58
CONFRONT	6/26/91	NA	NA	5	3	7	12	12
GALLERY 75DF	6/14/91	3	0	0	5	0	6	0
GALLERY 75DF	6/20/91	NA	0	0	5	3	7	0
GALLERY 75DF	6/26/91	NA	NA	0	0	0	0	0
CUTLESS 50W	6/14/91	0	3	0	8	0	5	0
CUTLESS 50W	6/20/91	NA	0	3	10	0	5	0
CUTLESS 50W	6/26/91	NA	NA	0	0	3	8	0
<b>LSD (P=0.05)</b>		<b>8.2</b>	<b>12.7</b>	<b>12.7</b>	<b>14.1</b>	<b>14.6</b>	<b>14.8</b>	<b>15.7</b>

<sup>1</sup> Rating system is a progressive scale ranging from 0=No Injury and 100=Completely dead

<sup>2</sup> Treatments were applied to 2000ft<sup>2</sup> of low maintenance turf on 6/12/91

<sup>3</sup> 6/14/91, 6/20/91 and 6/26/91 are the 1st, 2nd and 3rd mowings respectively, and they correspond with 2 days after treatment, 8 days after treatment and 2 weeks after treatment

**TABLE 4 - MULCHING ORNAMENTAL PLANTS WITH TREATED TURFGRASS CLIPPINGS**

HORTICULTURAL BEAN PLANT QUALITY (0-100)<sup>1</sup>

TREATMENTS TO TURF <sup>2</sup>	DATE OF MULCHING <sup>3</sup>	6/20	6/24	6/27	7/2	7/9	7/12	8/6
UNTREATED CONTROL	6/14/91	0	0	0	0	10	15	0
UNTREATED CONTROL	6/20/91	NA	5	3	13	10	12	0
UNTREATED CONTROL	6/26/91	NA	NA	0	0	3	5	0
DURSBAN 4E	6/14/91	2	6	0	6	5	5	0
DURSBAN 4E	6/20/91	NA	3	0	13	7	18	0
DURSBAN 4E	6/26/91	NA	NA	0	0	3	13	0
TURFLON II AMINE	6/14/91	53	48	35	52	36	40	13
TURFLON II AMINE	6/20/91	NA	12	8	32	13	13	0
TURFLON II AMINE	6/26/91	NA	NA	6	21	17	11	0
CONFRONT	6/14/91	66	83	92	100	100	100	100
CONFRONT	6/20/91	NA	48	34	79	85	93	100
CONFRONT	6/26/91	NA	NA	3	38	60	68	48
GALLERY 75DF	6/14/91	17	27	20	45	29	46	17
GALLERY 75DF	6/20/91	NA	18	15	25	23	38	12
GALLERY 75DF	6/26/91	NA	NA	0	10	10	20	0
CUTLESS 50W	6/14/91	3	13	7	42	35	41	38
CUTLESS 50W	6/20/91	NA	6	0	32	26	35	15
CUTLESS 50W	6/26/91	NA	NA	0	0	3	10	0
<b>LSD (P=0.05)</b>		<b>8.2</b>	<b>12.7</b>	<b>12.7</b>	<b>14.1</b>	<b>14.6</b>	<b>14.8</b>	<b>15.7</b>

<sup>1</sup> Rating system is a progressive scale ranging from 0=No Injury and 100=Completely dead

<sup>2</sup> Treatments were applied to 2000ft<sup>2</sup> of low maintenance turf on 6/12/91

<sup>3</sup> 6/14/91, 6/20/91 and 6/26/91 are the 1st, 2nd and 3rd mowings respectively, and they correspond with 2 days after treatment, 8 days after treatment and 2 weeks after treatment