PERFORMANCE OF BALANCE IN UNIVERSITY OF WISCONSIN-MADISON
WEED MANAGEMENT STUDIES

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Balance herbicide was registered for preemergence application for corn weed management in 17 states in 1999. But, the U.S. EPA requested that the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) send a letter asking that the herbicide not be registered for use in Wisconsin! The EPA was concerned that the herbicide or its metabolites might contaminate surface or groundwater and injure irrigated vegetable crops. But irrigated vegetable crops are also grown in the 17 states where Balance was registered. The EPA allowed those states to exclude Balance use in sensitive areas. Unfortunately, DATCP accepted the EPA’s request without first talking to Chris Boerboom or myself, and determining how important Balance was to Wisconsin corn growers. Thus Wisconsin corn growers who were already operating at a disadvantage because of Wisconsin’s atrazine rules, were again denied an important production tool available to their competitors in other states.

Balance has been included in University of Wisconsin-Madison weed management studies since 1995. With the exception of atrazine, Balance has been the best preemergence corn herbicide I have tested in the last 29 years! Balance has provided outstanding control of most annual weeds, including early season suppression of wild-proso millet and woolly cupgrass. Corn injury has not been a problem on the silt loam soils at the Arlington Experiment Station, or on farmer fields near Baraboo, Edgerton, Milton and Watertown. But, slight injury was observed on some sweet corn hybrids at Arlington, and at higher rates on field corn grown on the irrigated sands at Hancock. The current Balance label for other states prohibits Balance use on sands and on sweet corn. But the minor injury we have encountered is a warning that infrequent adverse weather conditions will result in Balance injury to some field corn production fields as well!

Getting a new preemergence herbicide registered in Wisconsin is important to our farmers and pesticide applicators. Local atrazine prohibitions and the cancellation of the Bladex label has resulted in a shortage of safe and effective preemergence corn herbicides that will control velvetleaf and other troublesome broadleaf weeds. The best alternatives now labeled must be applied postemergence. But, we don’t have enough application equipment in the state to treat all of the corn acreage postemergence in a timely manner! Additionally, excessive reliance on postemergence herbicides may result in resistant weeds with morphological tolerance such as thickened cuticles, more leaf waxes, or delayed emergence. The best way to minimize future weed problems would be a rotation of soil applied and postemergence herbicides! The unique mode of action of Balance makes this herbicide an important tool for combating herbicide resistant weeds.

Balance has two weaknesses and one highly publicized “strength”. The weaknesses are that it does nothing against wild buckwheat, and it is weak on yellow foxtail as well. But, appropriate tank-mixed or prepackaged combinations with other herbicides solves these problems. The strength is that if it doesn’t rain soon after application, “recharge” will occur after it does rain. From my experience, recharge appears to be a cosmetic effect. I urge growers using Balance to take matters into their own hands if it doesn’t rain after application, and start using the rotary hoe or cultivator. Chris Boerboom has had generally similar results to mine, except in 1997 when his treatments did not receive rain until 18 days after application. Even though symptoms of “recharge” occurred, performance was poor! Experience has also shown that Balance, like most soil applied herbicides, is weak against hedge bindweed. Perennial weeds probably are best controlled by Roundup in a Roundup Ready cropping system. There have been some claims that Balance alone will

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control woolly cupgrass. My experience is that Balance makes an outstanding initial treatment in a preplanned sequential combination. Following Balance with Accent, Roundup, or Liberty assures control of both wild-proso millet and woolly cupgrass. Results of field studies are summarized below:

1995: Balance was included in two studies. The first involved 55 preemergence treatments. The untreated check resulted in a corn yield of only 11 bu/A, and a standard Bicep treatment resulted 168 bu/A. Corn yields in five Balance treatments ranging from 0.5 to 1.5 times the normal application rate ranged from 163 to 173 bu/A. Combinations of Balance with half rates of Dual, Harness, Frontier and Lasso had corn yields ranging from 161 to 177 bu/A. The 177 bu/A was the highest yield in the study. Similar treatments were included in a wild-proso millet management study. The non-treated control had a corn yield of 69 bu/A, and Accent plus Clarity resulted in a yield of 145 bu/A. The five rates of Balance alone had corn yields ranging from 126 to 158 bu/A, and the combinations of Balance with half rates of Dual, Frontier, Harness and Lasso had yields ranging from 156 to 169 bu/A.

1996. Balance was included in five studies. The first study included 38 preemergence treatments. The untreated check had a corn yield of only 49 bu/A and a standard Bicep treatment had a yield of 164 bu/A. Corn yields of four Balance treatments ranging from 1.0 to 1.5 times the normal application rate ranged from 150 to 162 bu/A. Combinations of Balance with reduced rates of atrazine, Dual and Harness had corn yields ranging from 157 to 171 bu/A. The highest yielding treatment in the study was 173 bu/A. In wild-proso millet management studies, sethoxydim resistant (SR) field corn and imidazolinone resistant (IR) field corn accounted for 50 herbicide treatments. In the SR study, out of 15 treatments, the lone Balance/Poast Plus treatment had the highest corn yield at 126 bu/A. In the IR study, five Balance treatments either alone or in combinations with Harness or Accent had corn yields ranging from 142 to 152 bu/A. The highest yielding treatment in the IR study was the Balance + Harness treatment at 152 bu/A. Yields in the weedy checks in both studies were 60 and 61 bu/A, respectively. Standard treatments including Poast Plus + Laddok S-12 and Clarity/Accent had corn yields of 126 and 146 bu/A, respectively. Both SR and IR corn were again used in similar treatments in woolly cupgrass management studies. A total of 54 treatments included three with Balance used alone at 1.0 to 1.5 times the normal application rate and three Balance combinations with Accent, Harness and Poast Plus. The corn yields in the SR study ranged from 30 to 89 bu/A with a weedy check yield of 27 bu/A. The sequential combination of Balance/Poast Plus resulted in a corn yield of 79 bu/A. In the IR corn, yields ranged from 68 to 129 bu/A with a weedy check corn yield of 14 bu/A. The Balance/Accent treatment was the highest yielding at 129 bu/A. When Accent + Clarity were applied alone, corn yields were 84 and 68 bu/A for the SR and IR corn, respectively.

1997. Balance was included in four studies. The first study was in IR corn. It included 62 total treatments, three with Balance alone at rates from 1.0 to 1.28 times the normal application rate and resulted in corn yields ranging from 127 to 171 bu/A. Also included were 18 Balance combinations with atrazine, Dual, Harness and other experimental herbicides which resulted in corn yields from 134 to 171 bu/A. The highest corn yield in the study was the 171 bu/A from Balance at less than the normal field rate. The yield in the weedy check was only 20 bu/A. The second study was a Liberty Link field corn trial. Altogether, the study had 62 treatments in pre/post and spike/post sections. Balance at 0.5 the normal use rate was applied prior to Liberty, and Balance was combined at 0.75 the normal application rate with Harness pre and spike. The Balance treatments had corn yields of 144, 146 and 152 bu/A, respectively. In this study the untreated check had a corn yield of 44 bu/A, and the range in corn yields in all treatments was 93 to 164 bu/A. The third study evaluated wild-proso millet control using IR field corn. A total of 43 treatments were evaluated, three including Balance. Balance pre, at 0.8 and 1.0 times the normal use rate resulted in corn yields of 157 and 173 bu/A. When tank-mixed with Harness pre at suggested use rates, the corn yield was 170 bu/A. The range in corn yields for the millet study was 137 to 186 bu/A, and the weedy check had a yield of 101 bu/A. The fourth study had two separate sections containing 19 SR corn and 50 IR corn treatments evaluating woolly cupgrass control. A total
of three pre Balance treatments were made ranging from just below the normal field rate to the normal rate. The corn yields were 158, 160 and 159 bu/A. Four sequential treatments which included Balance had corn yields ranging from 151 to 169 bu/A. Altogether, the corn yields in treatments in the two sections ranged from 125 to 169 bu/A, and the weedy checks had yields of 106 and 107 bu/A. Standard Accent + Clarity + Poast Plus and Surpass/Clarity/Accent treatments had corn yields of 164 and 161 bu/A, respectively.

1998. Balance was included in eleven studies. In an IR field corn study, 18 treatments included two Balance combinations. Balance at the normal use rate pre plus Harness had a corn yield of 224 bu/A and Balance pre followed by early post Lightning at reduced rates had a yield of 261 bu/A. Dual II + Pursuit pre and the weedy check had corn yields of 226 and 98 bu/A, respectively. A second study in Roundup Ready corn included 45 treatments. Two Balance combinations with Harness had corn yields of 203 and 212 bu/A and two combinations with Roundup had yields of 215 and 211 bu/A. The weedy check and a standard Bicep treatment had corn yields of 73 and 216 bu/A. A third study contained 103 treatments with corn yields ranging from 206 to 248 bu/A and a weedy check with a yield of 185 bu/A. Thirty Balance treatments including four pre’s with Balance alone, eight Balance combinations or sequentials with experimental compounds, and 18 Balance combinations or sequentials with various herbicides such as Accent, atrazine, Dual II, Harness, and Sencor resulted in corn yields ranging from 222 to 247 bu/A. The third study also contained an additional 29 treatments including four pre/post sequentials of Balance with herbicides such as Accent, atrazine, Python and experimtals. The corn yields of the sequential Balance treatments ranged from 235 to 247 bu/A. A fourth study was conducted in Liberty Link corn. The 20 treatments included three Balance treatments. Balance + Harness had a corn yield of 212 bu/A, and Balance/Liberty at two rates had corn yields of 206 and 210 bu/A. The weedy check had a yield of 154 bu/A and the range of corn yields in all treatments was 194 to 214 bu/A.

Another 1998 study in SR corn evaluated the timing of Balance application on wild-proso millet control. Included were six Balance treatments with and six without cultivation out of a total of 18 treatments. The corn yields from the Balance combinations ranged from 181 to 192 bu/A, with a corn yield in the weedy check of 151 bu/A. The yield range of all herbicide treatments was 172 to 194 bu/A. A sixth study evaluated wild-proso millet control in Liberty Link corn. Two Balance combinations with Liberty were included in the 18 treatment study. Overall, the corn yields ranged from 188 to 217 bu/A, with the weedy check having a yield of 160 bu/A. The two Balance treatments had corn yields of 203 and 205 bu/A. The seventh study evaluated 41 treatments for wild-proso millet control in IR corn. The range in corn yields was 194 to 218 and the weedy check had a yield of 188 bu/A. Balance was included as three pre treatments, and twelve sequential treatments with herbicides such as Accent, atrazine, Dual II, Harness, Lightning, Pursuit and Surpass. Corn yields in the Balance treatments ranged from 194 to 218 bu/A. A wild-proso millet management study with Roundup Ready corn included 40 total treatments and six Balance treatments. Corn yields in the Balance treatments ranged from 216 to 225 bu/A, whereas other treatments had a yield range of 199 to 230 bu/A. The weedy check had a yield of 180 bu/A, and a standard Harness/Accent treatment had a corn yield of 209 bu/A.

In 1998, Balance was also included in three woolly cupgrass management studies. Corn yields in a Liberty Link corn study ranged from 53 bu/A in the weedy check to 178 bu/A with two applications of Liberty. The two sequential treatments of Balance and Liberty had corn yields of 161 and 170 bu/A. Nineteen of 50 treatments in an IMI corn study included Balance. The corn yield in the weedy check was only 39 bu/A and in a Prowl/Lightning treatment the yield was 173 bu/A. Balance treatments had yields ranging from 167 to 200 bu/A. In a Roundup Ready corn study with 41 treatments, the weedy check had a yield of 62 bu/A and two applications of Roundup Ultra resulted in 170 bu/A. Sequential and tank-mix combinations including Balance had corn yields ranging from 145 to 172 bu/A.

1999. Balance was included eight studies in 1999. In a study at Arlington with 53 treatments in mixed trait IMI - Liberty Link corn, 12 Balance treatments resulted in corn yields ranging from 191 to 206 bu/A. The
weedy check had a yield of only 89 bu/A, and a standard Lasso + atrazine treatment had a yield of 199 bu/A. The top yield in this study was 207 bu/A with Prowl followed by Liberty. Ten Balance treatments in a Roundup Ready corn study with 74 treatments had yields ranging from 209 to 244 bu/A. The weedy check had a yield of 123 bu/A, and two applications of Roundup resulted in a yield of 232 bu/A. In a study with 94 treatments, the 19 Balance treatments had corn yields ranging from 194 to 211 bu/A. The weedy check had a yield of 82 bu/A, and the standard Lasso + atrazine treatment had a yield of 196 bu/A. The highest yield in this study resulted from an application of Dual II Magnum + atrazine followed by Northstar and was 215 bu/A. In an application timing study, mixtures of Balance and Bicep were effective whether incorporated deep or shallow has much as 14 days ahead of corn planting. Balance was also included in the four economic studies reported elsewhere in these proceedings. At Baraboo, a combination of Balance and atrazine was the most profitable treatment in the study.