USGA Final Progress Report - 1992
Development of Curly Mesquitegrass as a Desert Turfgrass
Executive Summary

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Information pertaining to the tolerance of mesquitegrass to herbicides is necessary if recommendations are to be made regarding the use of these chemicals in stands of this grass used for turf or seed production purposes. We conducted a greenhouse and field study in 1992 to see how the mesquitegrass responded to 16 different herbicides used in the pre-emergence or post-emergence control of turf weeds. Greenhouse and field data included plant height, color, % brown leaf tissue, and number of flower spikes over a two month period following the foliar application of chemicals. Plant shoots and roots were also harvested at the conclusion of the greenhouse study.

Results from this study can now be used to make some recommendations regarding the use of these herbicides. For example, the chemicals Ronstar, Image, and Sencor were found to be phytotoxic to mesquitegrass under greenhouse conditions while these chemicals plus Trimec, MSMA, Mecoprop, Banvel, and 2,4-D caused injury under summer field conditions. The remaining eight chemicals were safe even under extremely hot, dry field conditions. The chemicals Bensulide, Pre-M, Mecoprop, Image, Ronstar, Sencor, and Benefin reduced the number of flower spikes present on the mesquitegrass. Therefore these herbicides might be avoided in field situations where seed production is necessary, either as a crop or for self-establishment. The herbicides Trimec and 2,4-D were found to promote a greater root mass in potted plants when compared to untreated controls while no herbicide resulted in a reduction or increase in shoot weight. Deeper and more extensive roots are desirable under field conditions.

It is hoped that mesquitegrass will be used a seed established, low-maintenance grass in the SW United States. Therefore it is necessary to determine some seed yield information on this plant. As a result, plant material from six clones of mesquitegrass was selected in early 1992 from our Safford, AZ collection and planted in replicated plots in Tucson to determine potential annual seed yield. This plant material is still becoming established and some seed yield information will be obtained during 1993.

Work also continues on studies established prior to 1992. In particular, three bulk seed harvests (by hand) occurred in Safford. This seed will be germinated in the greenhouse in late winter for a large-scale planting (several thousand plants) in Tucson in Spring 1993. Further selection of plants based on seed yield and turf characteristics will occur.

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Two new studies were established in 1992 and work also continued on plots established earlier by C.F. Mancino, A. Maricic, and A.E. Ralowicz.

For the new studies, Study 1 examined the phytotoxic effects of sixteen pre- and post-emergent herbicides on clonal curly mesquitegrass grown in 10.2 cm diameter greenhouse pots and in micro-field plots (20 cm diameter). The chemicals tested included benefin (Balan), bensulide (Betasan), DCPA (Dacthal), dithiopyr (Dimension), oxadiazon (Ronstar), pendimethalin (Pre M), pronamide (Kerb), simazine (Princep), 2,4-D, dicamba (Banvel), imazaquin (Image), mecoprop, metribuzin (Sencor), MSMA, and Trimec (2,4-D + MCPP + dicamba). All treatments were spray applied to mesquitegrass foliage at two times the recommended rate in order to simulate overlap during a routine spray application. Greenhouse and field data included plant height, color, % brown leaf tissue, number of flower spikes taken over a two month period. Plant shoots and roots were harvested at the conclusion on the greenhouse study.

Study 2 involved the establishment of mesquitegrass plots for the purpose of seed yield information in 1993. This experiment was planned following the USGA's monitoring visit in early May in which Dick Cooley, of Barkley Seed Company, also participated. Barkley Seed has expressed interest in mesquitegrass for roadside use, but needs further information on seed yield.

Study 1

Greenhouse Study. Treatments had a significant effect on all the plant variables measured. Overall, DCPA, Princep and Sencor promoted slightly better color in green leaf tissue of the mesquitegrass when compared to untreated controls, while Image reduced color slightly. Untreated mesquitegrass typically had a light green color (a rating of 5 on a scale of 1 to 9) and about 13% brown leaf tissue. When compared to controls, only Ronstar, Image and Sencor caused plants (on average) to have more brown tissue than the controls. Ronstar increased brown tissue by 53%, Image by 18%, and Sencor by 12%. As a granular material, Ronstar has been used quite successfully in our field plots, but when dissolved and spray applied (as in this greenhouse study) proved to be quite phytotoxic. Ronstar resulted in a ninety percent browning of leaf tissue five days following spray application. After two months, Ronstar treated plants were still 65% brown, Image treated

plants were 36% brown, and Sencor treated plants were 29% brown. All other herbicide treatments were equal to the controls for brown leaf tissue.

Plant height from soil to tallest leaf was increased by about 2.5 cm by the chemicals Bensulide and Kerb. Ronstar, Pre-M, Mecoprop, Sencor, and Image resulted in plants about 2.5 cm shorter than controls. Bensulide, Pre-M, Mecoprop, Image, Ronstar, Sencor, and Benefin also reduced the number of inflorescences present per plant.

Trimec and 2,4-D was found to increase root dry matter in these potted plants by 79% and 54%, respectively, compared to controls. Trimec contains 2,4-D, Banvel, and MCPP. Banvel alone decreased root weight slightly, but not significantly. MCPP was not tested alone. No herbicides, even Ronstar, resulted in a statistically significant reduction in root mass. For shoot weights, significant differences occurred between herbicides, but no herbicide treatment resulted in shoot weights different from the controls. Between herbicides, Kerb and Dimension had the highest shoot weights while Image and Sencor had the lowest. This represented a difference of about 1.7 g shoot tissue/pot.

Field Study. All herbicides except Princep, Kerb, Bensulide caused a decrease in leaf color in the field. Data pooled over the two month study showed that Ronstar resulted in 100% brown plant tissue, followed by Sencor (65%), Trimec (60%), MSMA (48%), Mecoprop (41%), Image (35%), Banvel (25%), and 2,4-D (22%). Controls were 11% brown. The field study was performed in late August when daily high temperatures were exceeding 32C. With the exception of the Ronstar and MSMA treated turfs, herbicide injury improved slightly over time. Ronstar injury remained at 100% while MSMA injury decreased 55%. Sencor, Trimec and Image injury decreased about 9% and remained browner than controls. All other herbicides were equal to controls (10% brown) at the end of this study.

Study 2

This study was initiated in late May 1992 for the purpose of gathering seed yield data during the 1993 growing season. Plant material from six clones of mesquitegrass was selected in early 1992 from our Safford collection. Five selections were made based upon the number of early season inflorescences present. One clone was selected for vegetative traits. The plant material was plugged into 2 m^2 plots in Tucson and was fertilized and irrigated to promote complete establishment. Due to very hot, dry, and windy conditions much of this plant material died. The experiment was replanted in late June and establishment was successful. Complete groundcover and seed yield information is expected in 1993.