DEXTER, ALAN G., JOHN L. LUECKE AND MARK W. BREDEHOEFT. Professor, Research Specialist, Department of Crop and Weed Sciences, North Dakota State University, Fargo, ND 58105 and Agronomist, Southern Minnesota Beet Sugar Cooperative, Renville, MN 56284. Postemergence control of broadleaf weeds in sugarbeet.

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Postemergence herbicides were applied an average of 2.9 times per acre to sugarbeet in eastern North Dakota and Minnesota in 1992. Even with extensive herbicide usage, weeds were named as the worst production problem by 45% of the respondents to the 1992 annual survey of sugarbeet growers. Field experiments were conducted at ten locations in eastern North Dakota and Minnesota in 1992 with the objective of determining sugarbeet injury and control of several weed species from combinations of registered and non-registered herbicides. Herbicides were applied in 8.5 gpa of water at 38 psi through 8001 nozzles. All treatments were applied twice with the first application at the cotyledon to two-leaf stage of the sugarbeet and the second application five to seven days later. Desmedipham (Betanex), endothall (H-273), and desmedipham & phenmedipham (Betamix) were applied at 0.25 lb/A followed by 0.33 lb/A. Clopyralid (Stinger) was applied twice at 0.09 lb/A and DPX-66037 (Upbeet) twice at 0.0156 lb/A. Rates were not changed in combinations. Desmedipham & phenmedipam plus ethofumesate (Nortron) was applied twice at 0.3 + 0.15 lb/A.

Desmedipham, desmedipham plus clopyralid, desmedipham plus DPX-66037, and desmedipham & phenmedipham plus clopyralid caused from 24 to 29% sugarbeet injury averaged over five locations. Desmedipham plus clopyralid plus DPX-66037 gave 34% injury and desmedipham & phenmedipham plus ethofumesate caused 44% injury. Desmedipham plus clopyralid gave better control of common lambsquarters, wild buckwheat, and eastern black nightshade than desmedipham alone. Desmedipham plus DPX-66037 gave better control of kochia, redroot pigweed, velvetleaf, and eastern black nightshade than desmedipham alone. Desmedipham plus DPX-66037 gave better control of redroot pigweed and eastern black nightshade to desmedipham alone. Desmedipham plus clopyralid gave control of redroot pigweed and common lambsquarters similar to desmedipham plus DPX-66037 while desmedipham plus clopyralid gave superior control of wild buckwheat and desmedipham plus DPX-66037 gave superior control of kochia, velvetleaf and eastern black nightshade. Desmedipham plus DPX-66037 gave superior control of kochia, velvetleaf and eastern black nightshade. Desmedipham plus DPX-66037 gave superior control of kochia, velvetleaf and eastern black nightshade. Desmedipham plus clopyralid gave superior control of velvetleaf while desmedipham plus clopyralid plus DPX-66037 gave 95% control of velvetleaf while desmedipham plus clopyralid gave 13%, and

desmedipham plus DPX-66037 gave 73% control. DPX-66037 plus X-77 surfactant gave 98% kochia control while DPX-33037 plus clopyralid gave 63% control, suggesting antagonism between DPX-66037 and clopyralid. However, desmedipham & phenmedipham plus DPX-66037 plus clopyralid gave 97% kochia control, suggesting that the desmedipham & phenmedipham overcame the antagonism. Desmedipham & phenmedipham gave 34% kochia control when used alone. Desmedipham & phenmedipham plus ethofumesate gave better control of wild buckwheat, velvetleaf, eastern black nightshade, kochia, redroot pigweed, and common lambsquarters than desmedipham & phenmedipham plus clopyralid. However, sugarbeet injury from desmedipham & phenmedipham plus ethofumesate was excessive at most locations.

magget (Temeops myopaetomis), wire worm (Umpnius spp), cut worm (Eardroma saucia, Euxoa sp), and crown borar (Hulstia undulatea).

In a separate experiment at Crookston, MN desmedipham & phenmedipham was applied twice at 0.19, 0.3, and 0.37 lb/A alone and in combination with ethofumesate at half the rate of the desmedipham & phenmedipham. Two experimental premix formulations and one mixture of commercially available herbicides were compared. Treatments were applied at the cotyledon stage of sugarbeet and again six days later. Desmedipham & phenmedipham plus ethofumesate gave more sugarbeet injury than the same rate of desmedipham & phenmedipham with all tested formulations and rates. Desmedipham & phenmedipham plus ethofumesate at 0.19 + 0.09 lb/A gave similar sugarbeet injury, kochia control, and prostrate pigweed control as compared to desmedipham & phenmedipham at 0.3 lb/A.

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Dur inmul attempt to increase plant population involved getting growers interested in 22 nows. After several years of testing and relatively minimal economic success, our growers reverted back to 30° rows. Currently, 70% of our row spacings are 30° while the remainder are at 28° rows. The cost of conversion was basically too high.

At a spin-oil to narrow rises, car research shifted its emphasis to factoring havest populations by increasing our seed spacing at planting time. Our seed specing has dropped from 6-18° in 1981 to 5.08° has year. (Table I)

Our plant population tests over the most recent years have fostered the trend and we concurage our provers to follow our research results. Table 2, which is an average over the last time years, and covers eight different locations, strongly suggests that a good stand of beets should be our first priority to producing a high quality crop. At 160% stand, we produced 6,713 pounds of RWSA while at 60% stand, we produced 5,324 younds of RWSA.

In 1992, we did not experience the hig difference because of the unusual weather patterns in Michigan. In Table 3 however, you can see that there is a 500 pound increase in usual per acre when we compare 100% stands versus 160% stand.

Producing a stand of beets in excess of 130 is not antomatic and we too experienced difficulties in 1991. Therefore, very little data from 1991 has been included in this report.

New, at the same time we've been increasing our plant populations, we've had an increased, interest in applying more nitrogen to support the increased stands. When we consider for previous research, it's easy to inderstand why there was some concern.

I wo things were apparent in Table 4

- Plant populations over the years averaged around 100%.
- The best RWSA was found not to exceed the 80-100 lbs, range of initiagen.

Ail the records established, since 1963 remain fairly consciant. As we increase the amount of nitrogen applied, the RWSA increases to a level and then decreases on the imper end. At the same time, the percent sugar decreases with applied notogen and the tota per arre level off.