

Dual/Princep where various ornamentals represent the roadside landscaping.

Also, Ciba-Geigy is testing a new compound identified as CGA-82725, which is a postemergence grass control herbicide. The complete activity of this compound has not been reported to date.

A registration for a Tandex/Princep mixture is currently being planned. This combination will offer a potential for either selective control of annual weeds, or complete vegetation control, depending on rates applied. Ciba-Geigy is striving to find new and better compounds for use as well as to determine new uses for old compounds to better service the roadside vegetation management programs in the United States.

FUTURE IN CHEMICAL ROADSIDE VEGETATION MANAGEMENT Stephen R. Muench

(Muench's presentation was not available for publication.)

FUTURE IN CHEMICAL ROADSIDE VEGETATION MANAGEMENT M.R. Jones

Chevron Chemical Company has two herbicides that can be used for right-of-way maintenance--Ortho Paraquat CL and Ortho Diquat 2 spray. Ortho Paraquat CL is a restricted herbicide; it can be applied only by licensed applicators. It is a contact herbicide with a quick burndown or disiccation on grasses and weeds. Sometime ago we made available a reference book on Paraquat Toxicology and Poisoning. This listed treatment procedures, methodology, and information on Paraquat.

Ortho Diquat 2 spray has been labeled for right-of-way, highway, and other areas that have unwanted weeds and grasses. It is also a contact herbicide and it is a nonrestricted product. It is compatible with many residual herbicides to help develop a complete maintenance program. Both terrestrial and aquatic species are listed on the label that makes the product a dual-purpose contact herbicide. Diquat 2 spray has an LD 50 of 440. It carries a warning statement on the label.

Ortho X-77 spreader is a non-ionic surfactant that is recommended for use with both Ortho Paraquat CL and Ortho Diquat 2 spray. It is necessary to add a non-ionic surfactant to obtain the best results with either of these products. This aids in wetting both weed and grass species and helps inhibit foaming.

FUTURE IN CHEMICAL ROADSIDE VEGETATION MANAGEMENT John W. Matteson

Embark^R 2-S Plant Growth Regulator (PGR) is a versatile, newly developed product from 3M designed to reduce the cost of grass maintenance in locations such as highway rights-of-way, airports, golf courses, and cemeteries. Embark 2-S PGR is formulated as a diethanolamine salt solution containing the equivalent of 2 lb active ingredient/gal. Toxicological studies show that, when used according to

label recommendations, Embark PGR presents no hazard to the user or the environment.

Embark PGR may be tank mixed with 2,4-D for total vegetation management. Research has shown that no incompatibility exists when Embark PGR is tank mixed with Dicamba, MCPP, and other broadleaf weed control herbicides. Embark PGR will reduce or eliminate mowing requirements for a minimum of 5 weeks on Bermuda grass and a minimum of 8 weeks on cool-season grasses such as Kentucky bluegrass, tall fescue, chewings fescue, red fescue, and several other species. Year-long seedhead suppression can be attained on cool-season species by making spring applications before the seedhead develops. Fall applications give spring vegetative growth suppression and seedhead control on many cool-season species. Mowing may be made before or after application or not at all. The important thing to remember is that the grass must be actively growing and healthy and not cut too short to get sufficient absorption of the chemical.

Any spray equipment that will apply 15-150 gal/acre of spray solution and give uniform coverage can be used for Embark PGR application. The quality of application is more dependent of the equipment operators than of the equipment itself. During its 2 years on the market, Embark has shown many states and municipalities that its use will reduce the labor assigned to mowing, thus allowing more flexible use of manpower and equipment, will reduce mowing risks, and fits in well with total vegetation management.

3M is continuing its research with Embark PGR to increase its utility in vegetation management. Other chemicals from the 3M research laboratories, such as MBR 18337, are showing promise as turf management tools of the future.

HERBICIDE SPRAY EQUIPMENT J.M. Custer

(Custer's presentation was not available for publication.)

HYDRO-SEEDING AND MULCHING MACHINERY Bob Jones

Establishment of vegetation of roadsides falls into two basic categories: the planting of living plants and the planting of seeds. One of the critical factors of successful planting is that of providing adequate moisture. The cost of irrigation made it necessary to seek ways to take better advantage of rainfall. Man learned centuries ago that a covering, such as rocks, leaves, or twigs, would help protect the new vegetation. Moisture was better retained in the soil, soil temperatures were moderated, and the plants were protected from erosion. In some cases a planting has been successful when under normal conditions it might not have been. In some cases, the reverse is true. The agricultural community has dealt with this less than 100 percent probability of success from the beginning of time.

Straw or hay mulching (high-profile mulch) has proved to be the most successful technique in the arid climates of the West. The process involves the planting of seed and fertilizer in the soil with one piece of machinery, then mulching with a layer of

hay or straw with another piece of machinery, and then tacking the mulch to the ground with sometimes a third piece of machinery.

Hydro-mulching, sometimes referred to as low-profile mulch, is a recent technological development in which the seed, fertilizer, and mulch are applied in a one-step process. Hydro-mulching has experienced significant success in the more humid eastern United States. The differences in the effects of the two mulches are simply that the higher-profile straw mulch is a more effective insulator and it helps retain moisture better. R.E. Blaser found that straw mulch tacked with wood fiber could possibly be the best treatment for a late fall planting, thus expecting the emergence of seedlings the following spring. If this procedure is adopted, it may well be that a new piece of equipment will evolve that combines the use of straw-mulching with hydro-mulching.

Other research has been done on the use of poly foams to simulate the high-profile effect of straw with possible use of the hydro-mulch machine. A significant advance is predicted in the near future to develop a machine that will pump a thicker slurry of wood fiber in the conventional hydro-mulching process. If the ratio of water to wood fiber can be reduced in the process, then the economics of hydro-mulching will be improved for a significant labor savings.

One piece of machinery likely to develop in the future is a machine combining high-profile and low-profile mulch. A second piece of machinery possible in the future will be some type of foam mulch dispenser. The futuristic machine we will all see in the next few years is a hydro-mulch capable of pumping more fiber per gallon of water.

WICK APPLICATORS Wayne W. Huffine

Several wick applicators are commercially available; however, Oklahoma uses BoBar rope applicator for roadside weed control investigations. It is designed for use on rights-of-way, including irregular terrains. We have worked with two BoBar wick applicators—one, an experimental unit about 6.5 ft wide mounted on the front of a pick-up truck, and the other, a three-unit BoBar Compensating Feed Rope Applicator that uses the tractor's existing hydraulic system and control valve. With both wings fully extended, it will effectively treat an area 14 ft wide.

One of the unique features of this kind of applicator is the ability to control high-growing weed species, such as Johnsongrass, while permitting low-growing erosion-resistant vegetation, such as Bermuda grass, to remain. Johnsongrass can effectively be controlled by using an appropriate herbicide with this machinery. For best results, the herbicide should be applied to actively growing plants when most have reached the boot to head stage of growth. The wick applicators are designed to apply herbicide to the stem and underside of leaves and undesirable plants. The advantages of the applicator are (a) it can be used in wind, (b) it can be used adjacent to water and desired plant life, and (c) it is generally considered efficient and economical. Some of the disadvantages are (a) the transport vehicle is limited to rather smooth surfaces, (b) the ropes must be kept clean, and (c) when stored for considerable time, the ropes must be kept out of bright light.

The front-mounted unit, weighing about 800 lb,

tends to make the tractor front heavy with a loss of traction in some situations, such as when the front-mounted unit is operated straight down from the face of a rather steep slope, and it becomes necessary to back up to turn around. The addition of weights to the rear wheels can generally remedy this situation.

The following table and other data represent a sample of the program evaluation of herbicides and speeds of application for the control of alfalfa on roadsides with a compensating feed rope applicator: date treated--July 2, 1980; date scored--July 15, 1980; plot size, 32 ft x 100 ft; replications, 3; herbicide dilution, 2 parts water to 1 part herbicide; method of scoring, 10 = complete control and 1 = no effect.

Expt. 4-H-7-80

Treatments	Speed of Application (mph)	Alfalfa Control Score
1. Roundup (3 lb ae/gal)	3	2.0
2. Roundup (3 lb ae/gal)	4	2.3
3. Roundup (3 lb ae/gal)	5	2.0
4. Weedmaster (1 lb ai dicamba plus 3 lb 2,4-D/gal)	3	6.0
5. Weedmaster (4 lb ai/gal)	4	5.7
6. Weedmaster (4 lb ai/gal)	5	5.3
7. 2,4-D (4 lb ai/gal)	3	1.7
8. 2,4-D (4 lb ai/gal)	4	2.0
9. 2,4-D (4 lb ai/gal)	5	1.7
10. Banvel (4 lb ai/gal)	3	5.0
11. Banvel (4 lb ai/gal)	4	5.0
12. Banvel (4 lb ai/gal)	5	4.3
13. Check	-	1.0

Significant differences	**
CV	13%
LSD.01	1.11

MOVING TREES MECHANICALLY George Wassenaar

(Wassenaar's presentation was not available for publication.)

EQUIPMENT TO IMPROVE HERBICIDE APPLICATION EFFICIENCY John Kubacak

Cibolo Manufacturing has developed a one-man operated herbicide sprayer called the Swingloktm. It is ideal for use by state highway departments, cities, and counties. It is capable of such diverse spraying operations as applying bareground herbicides under guardrails, signs on shoulders, selective treatments in the right-of-way, and foliage. The system attaches to the front bumper of the vehicle and incorporates special design booms for versatility and flexibility. This system allows for selective spraying up to 36 ft in the right-of-way. The spray swath consists of four 9-ft sections, each of which can be operated independently or in any combination by the flip of a switch on the dash-