

# when your season rolls around...



## be ready to roll with a NU nes sod harvester

PATENT APPLIED FOR



### NU nes Slab Sod Harvester . . .

lifts, cuts, and conveys slabbed sod to loading platform. Handlers can load directly on to pallet as tractor moves.

- With a NU nes Sod Harvester and three men you can lift, cut, roll and palletize up to 1200 square yards of sod per hour.
- The harvester, developed at Cal-Turf Farms in California, is designed to handle any length of rolled or slabbed sod.
- Field grading of sod is done by the tractor operator, who has clear visibility at all times.
- Hydraulic controls permit quick and easy adjustment for all conditions.
- The sod harvester travels alongside, never on the turf, during harvesting and can pick up and roll sod at any time your tractor can operate in your field.
- Sod can be cut with any type of sod cutter. The long ribbons can then be lifted and cut to any desired length from 24" to 90", size depending on thickness of sod.
- Loaded pallets can be spotted for later field removal and be clear of the next harvest run. If direct truck loading is desired, a conveyor extension is available.
- The basic power train is a Ford LLG-2110 wheel tractor. The sod harvester can travel at speeds up to 17 MPH for quick transportation between plots.
- The efficiency of this all-mechanical operation has been proven on Cal-Turf Farms in Patterson, California, and it can solve the problem of quick and economical harvesting of sod for all turf farmers.

For more information please contact:

**THE JOHN NUNES MECHANICAL HARVESTING CO.**

2006 Loquot Avenue, Patterson, California 95363, Phone (209) 892-6311



What's the difference  
between an acre of this

...and an acre of this?

**Oh, 'bout \$15.**

**Balan Granular stops crabgrass and other undesirable grasses before they start. Month after month. Cost? As little as \$15 an acre.** When you consider how little it costs to prevent unsightly bare spots and browned-out crabgrass, Balan is probably one of the biggest bargains ever. On northern (cool season) turfs, one yearly application controls crab-

grass and other annual weed grasses. And costs as little as \$15 an acre. On southern (warm season) turfs, where undesirable annual weed grasses have longer to germinate, a heavier rate and a second yearly application may be required. Even in southern areas, Balan hardly dents a maintenance budget. Look at the treated and untreated turf above. What made the difference? About \$15 worth of Balan per acre—and one turf professional's pride.



(Balan™—benefin, Elanco)

**The crabgrass killer  
that goes all out...  
all over...all season.**

**ELANCO PRODUCTS COMPANY:**

I'd like to know more about Balan Granular pre-emergence herbicide. Please send me complete technical information.

I'm interested in treating a total area of \_\_\_\_\_ acres.

I presently do \_\_\_ do not \_\_\_ use a pre-emergence herbicide.

Name \_\_\_\_\_ Title \_\_\_\_\_

Establishment \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

ES-444

# Balan Granular is the *all-over* turf herbicide.

## Take advantage of the modest price.

Use Balan—not only on the highly visible areas—but all over to stop smooth and hairy crabgrass, goosegrass (silver crabgrass), watergrass (barnyardgrass), yellow and green foxtail.

## Good safety margin.

Gentle enough to be applied on all these established turf grasses without injury, when used as directed: perennial bluegrasses, perennial ryegrass, fescue, centipede, St. Augustine, bermuda, zoysia, and bahia grasses. Balan contains no poisonous arsenic, mercury, or lead—vitally important for parks and other public areas.

## Balan is weatherproof.

Some herbicides form a thin surface barrier. Here's a weed-control zone that stays in place to kill weedy grass seeds as they germinate.

## Balan latches on, doesn't leach out.

It actually forms a bond with soil particles, resists the leaching effect of heavy rains and irrigations.

## Easy to use.

You can use either a drop-type or rotary-type spreader. Dependable, long-lasting Balan is formulated for the turfgrass professional.



ELANCO PRODUCTS COMPANY • A Division of Eli Lilly and Company • Indianapolis, U.S.A.

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P.O. Box 1968  
Indianapolis, Indiana 46205

**Balan**<sup>TM</sup>



(Balan<sup>TM</sup>—benefin, Elanco)

**FREE DETAILS!  
MAIL THIS CARD  
TODAY!**

## The Cover

Helicopters have become workhorses in the vegetation care industry. The Hiller 12-E, piloted by Gil Liming of Reforestation



Services, Salem, Ore., is one of 3 such ships owned by the corporation. It is equipped with Dow Chemical Company's adjustable in-flight swath system spray unit. Partner in the venture with Liming is H. S. Poulin. Most of their work is vegetation control on power line and railroad rights-of-way. The landing pod on the tank truck was built to order for the firm and facilitates landing in heavy brush where the rotors might become entangled. Landing atop the truck also prevents livestock or animals from damaging the rotors at night.

## WTT Mailbox

### A Cooperative Venture

I have not had the opportunity to congratulate you on the fine spread in Weeds Trees and Turf on our aquatic work... We have had several good comments about the article. You will note by the enclosed copy of the letter from Mr. John Underwood of Solo Industries to me that he is also pleased with the spread. Like him we are interested in obtaining copies....

Lyle W. Weldon

Crops Research Division  
Agricultural Research Service,  
USDA  
Ft. Lauderdale, Fla.

### We Are Happy To Oblige

In my work with licensed Windsor sod growers through the country, I have often recommended your magazine as a useful addition to the growers library.

If you would like, I could provide you with names and addresses of 50 potential subscribers who I am sure would appreciate a complimentary copy....

Paul Florence

Manager, Windsor Sod Culture  
and Marketing  
Scotts  
Marysville, Ohio

# WEEDS TREES and TURF

January 1968  
Volume 7, No. 1

FORMERLY WEEDS AND TURF

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## **From Whence Your Help**

Where will you find the men you'll be needing this coming season, or a year or even two years from now?

Capable help is in short supply. This isn't true just in isolated sections of the nation. No state or region is exempt. Nor is any one phase of the industry. Tree care companies can't find enough men to justify the time and money it takes to make them safe and competent workmen. Spraymen are even more pressed. More than half the states now have licensing laws. Requirements vary, but all require a licensed foreman with the equipment at all times. Some even require that the crew be licensed as apprentices. Turf care supervisors today have so much expensive equipment and such high investments in turf that they cannot afford to trust any but trained operators.

The existing situation is critical. Federal job training programs are not the answer. Too few trainees have the capability and responsibility to reach the technical level which the vegetation care industry demands. Many of those who could make the grade and reap a satisfying career cannot see the advantages in the business. Welfare payments of one type or another serve as a block to others who could handle at least part-time hourly jobs. This refusal to accept available jobs cannot be blamed on the pay scale. Minimum wage laws kill this argument.

We believe that the solution for spraymen, tree care companies, and others is a self-help training program. This type program must be preceded by a recruiting effort. Operators need to locate young men, sell them on a career in the business, and then train them over a period of years. Pay advances need to be commensurate with the level of responsibility and technical ability of the trainee, and pay will have to compete favorably with the local labor market.

Companies have been recruiting help for years, though it has been largely at the college level. This is true of golf course management now. We believe the recruitment program will need to reach the high-school youngster, well ahead of his graduation. He may be started on summer work, during which time the operator will be able to judge ability and encourage those young men he feels will be able to help his own business grow. Some financial help for technical schooling may well be in order for those trainees who show promise.

School counselors can suggest careers, but only the operator who knows the business can sit down with a young man and point out the coming technological changes which will challenge many young and capable men.

WEEDS TREES AND TURF is the national monthly magazine of urban/industrial vegetation maintenance, including turf management, weed and brush control, and tree care. Readers include "contract applicators," arborists, nurserymen, sod growers, and supervisory personnel with highway departments, railways, utilities, golf courses, and similar areas where vegetation must be enhanced or controlled.

# Bifluid Spray System



## Helps Place Herbicides On Target

By DAVID P. PETERSEN

Vice-President, Stull Chemical Company, San Antonio, Texas

A common problem in many endeavors is our human tendency to get "the cart before the horse". This old cliché is most certainly true in the chemical industry, specifically in the case of chemical pesticides, where a really fantastic array of new insecticides, herbicides, fungicides, etc., have reached the user market in a single score of years since World War II.

A vast majority of these new pesticides work—if you put

them where they belong and keep them there. It is at this point that the post-war cart got before the pre-war horse. Application techniques did not keep pace with product development, and the whole nation heard about some of the consequences through books, magazines, television, congressional investigations, and the courts.

Our own activities in the area of right-of-way brush control contracting brought these

facts home very pointedly. We were applying hormone herbicides from helicopters to narrow strips of brush stretching over thousands of miles of agricultural lands. The exposure rate to susceptible crops was obviously alarming, and we bought a few bales of premium cotton, some of the world's most productive vegetable gardens, and a number of priceless shade trees before we came to the full realization that there had to be a better way to

**Central Power & Light Company utilizes bifluid spray equipment to apply invert herbicide spray for right-of-way brush control inside city limits at Laredo, Tex.**



**U.S. Army installation at Fort Bliss, Tex., uses bifluid system for weed control around quarters areas. System is adaptable for industrial uses such as rights-of-way, fence lines, plant yards, sub-stations.**



apply 2,4-D, 2,4,5-T, and pesticides in general.

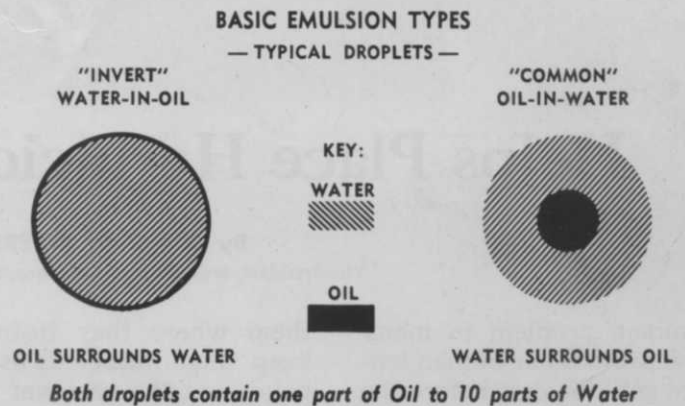
Thus motivated, we undertook a two-fold research program—safer formulations of the basic herbicides, and a safer way to get them from the helicopter to the right-of-way some 75 feet below the aircraft. Our formulation work focused on the water-in-oil (“invert”) emulsions which displayed good qualities of droplet size and drift control. Simultaneously, we developed a bifluid method of proportioning, mixing and spraying the water and oil phases of the emulsion in a continuous process. This was necessary due to the difficulties normally encountered in premixing the heavy, mayonnaise-like, “invert” emulsions and then pumping them into a sprayer for use.

The first commercial applications with the new Stull Bifluid System were made by helicopters on utility rights-of-way in 1959. Almost immediately, it became apparent that the same demands for improved application techniques were common to aerial and ground equipment alike, so the system was translated to all kinds of ground power sprayers for boom, air-blast, or handgun applications as well as to a much larger number of individual herbicide chemicals. In the latter case, a series of neutral spray adjuvants are used to produce “invert” emulsions in combination with the ever increasing number of water soluble, oil soluble, or conventionally emulsifiable herbicides available for selective weed control (See Figure No. 1). These spray adjuvants provide the means to apply one, two, or

## THE STULL BIFLUID SYSTEM

**GENERAL** — The Stull Bifluid System is a scientifically and commercially accepted method for the preparation and dissemination of water-in-oil (invert) emulsions. The major advantages of the system are:

1. Maximum control of spray drift approaching virtual elimination.
2. Absolute accuracy in proportioning of the oil and water components of the emulsion through orifices of known diameter.
3. Maximum mixing of components on a continuous basis, instantaneously, during actual spraying operations, to produce an “invert” emulsion of absolute homogenous composition.
4. Maximum uniformity of droplet size over the entire effective spray swath.
5. Maximum conservation of spray components since all of the chemical reaches its intended target.
6. Maximum versatility since the system may be installed on any type of application vehicle (aerial or ground).



**PRINCIPLE OF OPERATION** — The Stull Bifluid System is basically a process for the simultaneous proportioning, mixing and spraying of an oil-base pesticide chemical formulation and water. These components form an emulsion of water-in-oil, commonly referred to by agriculturists as an “invert” emulsion, rather than the “common” oil-in-water emulsion normally used in agriculture.

Water-in-oil emulsions characteristically have a thick “mayonnaise-like” consistency which in part accounts for their resistance to wind drift. In addition, the water part of the droplet is surrounded by an oil film which nearly eliminates the evaporation rate of droplets as they move through the air. Common oil-in-water emulsion droplets reduce in size rapidly as the outer water film evaporates. This resistance to evaporation by invert emulsions accounts for a part of the drift resistance and for the uniformity of spray pattern since the droplets remain essentially the same size from their point of discharge to their intended target.

**Helicopter applies invert emulsion of 2,4-D to alligatorweed infestation in Texas irrigation canal.**



**Results of early season control shown at the left are still apparent four months following treatment.**



**Figure No. 1. Herbicide Chemicals Now Being Applied Through the Bifluid Spray System**

Basic Herbicide	Formulation	"Inverting" Agent	Remarks
2,4-D and 2,4,5-T	Oil Soluable Amines	Self Emulsifying	Other herbicides may be added to the water phase.
2,4-D and 2,4,5-T 2,4-D, 2,4,5-T and 2,4,5-TP	Water Soluable Amines LV Ester Concentrates	Spray Adjuvant Use with Oil Soluble Amine or spray adjuvant	Emulsify LV Ester concen- trate in the water phase.
Ammonium Sulfamate	Salt	Spray Adjuvant	Dissolve Ammonium Sulfa- mate in water phase.
Dalapon	Sodium Salt	Spray Adjuvant	Dissolve Dalapon in water phase.
Dicamba	Amine Salt	Oil Soluble Amine of 2,4-D or 2,4,5-T, or spray adjuvant	Dissolve Dicamba in water phase.
Diquat	Salt	Oil Soluble Amine of 2,4-D or 2,4,5-T, or spray adjuvant	Dissolve Diquat in water phase.
MSMA	Salt	Oil Soluble Amine of 2,4-D or 2,4,5-T, or spray adjuvant	Dissolve MSMA in water phase.
Picloram	Potassium Salt	Oil Soluble Amine of 2,4-D or 2,4,5-T, or spray adjuvant	Dissolve Picloram in water phase.
Propanil	Emulsifiable Concentrate	Spray Adjuvant	Emulsify Propanil in water phase.

more herbicides at the same time.

**Existing Pumps  
Used In New System**

Simplification of equipment has been a constant goal with the bifluid system since its inception. From a rather complex dual storage, dual pumping, dual discharge, dual mixing nozzle has evolved the simple installation of a mixing device into the suction side of an existing sprayer pump. The discharge of the pump proceeds through existing equipment. There is, of course, a need for an additional storage tank to hold the oil phase of the emulsion, but this is only about one-tenth the size of the regular spray tank, since the mixing ratios involved average one part oil to nine parts water by volume.

Although the bifluid system was designed principally as a safety control in pesticide applications, other advantages presented themselves over a number of years usage (Figure No. 2). Foremost of these advantages appear to be the great reduction in evaporation losses as experienced with conventional emulsions and straight solutions, as well as the greater size uniformity and spreading characteristics available with "invert" emulsion drop-

lets in comparison to other liquid systems.

**Bifluid System Use  
Is Expanding**

The bifluid system is now finding expanding use throughout the world—from Africa to Australia to Europe to South America, as well as in the United States and Canada. Federal agencies have used the bifluid system in this country over the past several years on increasingly larger acreages for selective brush control programs in forests, rangelands, reservoirs and flood control projects.

Industrial usage has increased rapidly from the initial helicop-

**Figure No. 2. Advantages of the  
Bifluid Spray System Compared to  
Straight Solutions or Conventional  
Emulsions**

- Reduction in evaporation losses.
- Reduction in run-off waste.
- Reduction in spray drift.
- Reduction in application labor.
- Reduction in equipment corrosion.
- Reduction in rain washoff.
- Increase in foliage and stem penetration.
- Increase in droplet spreading characteristics..
- Increase in droplet size uniformity.
- Increase in spray unit capability.

ter applications. Rights-of-way, fence lines, plant yards, and substations are representative of the many industrial non-crop lands which require routine vegetation control maintenance—and more often than not, in close proximity to individual property-owner neighbors whose goodwill would be lost quickly if damages were allowed to occur.

Landscaped areas such as parks and golf courses can now be safely maintained free of broadleaved weeds and many undesirable grasses through the application of combination sprays such as 2,4-D, and MSMA without endangering ornamental plants close by.

We like to feel that the bifluid spray system was a major step forward in getting the horse back in front of the cart. Certainly, it has spurred a lot of worthwhile research and development in other, safer, application techniques since 1959. Agricultural and industrial losses due to undesirable vegetation are one thing—damages paid to a neighbor for perfectly unintentional drift or misplacement are something else—but the two losses come from the same pocket. Proper application with the bifluid spray system can do a very commendable job of eliminating both losses at one time.





**Mechanize and beat the labor problems** which beset many tree care companies today. This is the advice of Ted Smith who finds this 5-ton Alenco crane an indispensable piece of equipment.

**W**ELCOME to Smith Tree & Landscape Service, Inc. So states the opening line of the company's employe manual. It probably should be on their front door, too, since the Smiths are specialists both in their business

**Automated business office operation** has become key to business management for the Smiths. Handling Burroughs sensomatic machine is Mrs. Ardith Donner.



**Management session at breakfast bar** is almost daily occurrence for Smith Tree and Landscape Service, Inc. Key members of management are, left to right: Edwin E. (Ted) Smith, president and general manager; Mrs. (Jane) Smith, secretary-treasurer and landscape architect; Thomas D. Smith, head of spray department and diagnosis; and Henry J. LaBrosse, vice-president and manager of landscape planting and construction.

## Business Acumen and Specialized Training

*provide formula for success  
for  
Smith Tree & Landscape Service, Inc.  
Lansing, Michigan*

and in making clients and visitors feel at home.

Their business, which during the peak season carries 40 employes, is operated from their home. Management sessions are held at the breakfast bar and a fully automated business is carried on in the ground level basement. It's a totally different and expanded company than the Smith Tree Service which originated in 1945 and operated with the dining room and kitchen of their old home as headquarters.

Today, the company consists of 7 divisions, each operated by a specialist in the field. Edwin E. Smith, known coast to coast only as Ted, is president, general manager, and supervisor of the Tree Department. Ted points out that

this department of the business consists of a complete tree service including bracing, cabling, diagnosis, insect control, feeding, etc. Tree moving and planting is a phase of the landscape operation in their organizational structure. He also reports that tree removal is big business now and limited only by available manpower. Dutch elm disease is taking a great toll of the big trees in Michigan as is true in many other areas. The Smiths do a great deal of spraying along with taking out dead trees.

Early in his career, Ted served as a foreman for the city of Lansing and earlier as superintendent of grounds at Willow Run. During his tenure with the city of Lansing, he also did private