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Duckweed continued

achieve aquatic weed control. Unlike conventional water emulsions, which disperse readily in water, invert (water-in-oil) emulsions possess a consistency somewhat like mayonnaise and do not readily disperse and disappear.

He determined the optimum combination which would most effectively control the duckweed infestation was a mixture of Chevron Chemical Co.'s Diquat aquatic herbicide and Cutrine-Plus a copperbased algaecide from Applied Biochemists, Inc., Mequon, Wis. Chevron is based in San Francisco. It was applied through the Visko-Rhap spray system, incorporating Visko-Rhap inverting oil, to produce the invert emulsion. Rhodia Inc.'s Agricultural Division, Monmouth Junction, N.J. manufactures the oil.

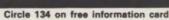
Dr. Blackburn normally recommends a dosage of one gallon of Diquat (two pounds of cation) and one gallon of Cutrine-Plus (0.9 pounds copper content) for this type of con-

trol. This amounts to equal volumes of the commercial formulations in the invert spray. In May of last year, he evaluated the use of the spray technique on a closed lagoon off the river several miles downstream from the steel plant's lake. This five-acre lagoon was almost completely choked with duckweed and served as a good test area. Being outside the river itself, it could not affect conditions downstream.

How system works. Depending upon the application, he employs either a truck-mounted spraying system (for work on irrigation canals) or, as in this case, an air-boat (for jobs on open water). The latter is a flat-bottom vessel powered by an aircraft engine mounted on the transom at the stern. A two-bladed airplane propeller pushes the shallow-draft boat across the surface of the water. Consequently, the presence of duckweed or floating debris does not impede its progress. ("All it needs is damp grass," Dr. Blackburn said.)

His air-boat utilizes the latest







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version of a gasoline-powered invert homogenizer (KW-MC-IOE-AAL Mechanical Invert Pump Pack) designed for aquatic spraying. Manufactured by the Minnesota Wanner Co., Inc. Minneapolis, Minn., it is capable of spraying 25 to 30 acres per day, at a rate of three or four acres per hour. Installed amidships, the unit accurately meters water, herbicides and inverting oil into the system by vacuum. The metering is done by orifice plates or discs, each with a strainer before it to prevent clogging. The water/oil ratio and the amount of herbicide to be used is all pre-calculated, to determine the proper size of orifice disc to use.

No further adjustments or measurements are required. The boat is equipped with a tank to hold the inverting oil, but the herbicides are kept in their original containers and are manifolded into the system through an orifice tube placed in each container. This eliminates the need for handling the herbicides, thereby saving time and adding a valuable safety factor to the oper-

ation.

The mixture then travels into the piston pump, which has a loop bypass, and then into the mechanical inverter. This is the main component of the system, and produces a consistent, thick water-in-oil emulsion. The invert then travels to the nozzle where it sprays out in the form of a thick strand, about the consistency of mayonnaise. This





Bayview Lake, its lower half almost completely blanketed by duckweed growth, regained its pristine appearance less than a week after being sprayed with the invert herbicide emulsion.

breaks up into smaller droplets as it approaches the target.

As the mayonnaise-like emulsion impinges on the duckweed at the surface, it sticks to individual plants and does not wash off in the water. The invert transfers from plant to plant as water movement brushes them together. Any globules of emulsion that don't touch a plant initially will float on the surface, without breaking up, until they do make contact. This assures full utilization of the herbicide. Within two or three days a complete kill is observed in areas properly sprayed with the system.

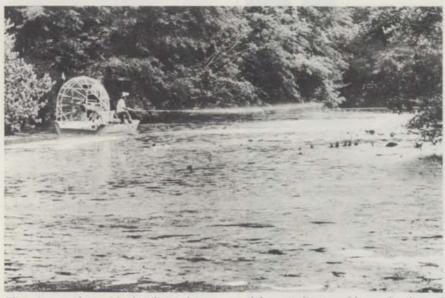
The test spraying proceeded with textbook effectiveness. Results were outstanding, and Dr. Blackburn quickly got the go-ahead decision to begin "Operation Duckweed".

Killed at the source. After the success of his test run in the lagoon, Dr. Blackburn went up-river to the major source of the Black Warrior River problem — 500-acre Bayview Lake near the steel mill. While the duckweed did not extend in a solid carpet all across the surface of the lake, it was particularly dense for a considerable distance out from the shore and in large floating islands in the center of the lake.

Using a single air-boat, Dr. Blackburn sprayed over 200 acres of infested surface in 7 days. The invert-spray technique proved as effective there as its trial run had promised, and within a few days the duckweed infestation was eliminated.

He followed this by a day's spraying of a heavily infested 25acre section of the river at Locust Fork, 12 miles downstream from Bayview Lake. As the duckweed in the river died out, the thick blanket of dead plants broke up and the re-

please turn page



Thin stream of invert herbicide emulsion sprayed from air boat readily reaches beneath overhanging trees to reach duckweed colonies close to shoreline.



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Duckweed continued

mains drifted downriver. The river quickly regained its usual clarity.

Vacationing fishers returned to their Black Warrior River camps in the summer of 1975. And, happily, so did the fish. As Dr. Blackburn explains, "The results of this spray project clearly demonstrated that aquatic weed control by the invertspray technique is effective, and economical, for this type of problem. In addition, our ability to place the herbicide in direct contact with the plant — without having it disperse in the water — reduces residue levels."

Low-cost effectiveness. The cost/performance relationship becomes increasingly important these days as environmental needs interface with economic reality. With conventional spray systems, Dr. Blackburn says it would take at least a gallon of each emulsion per acre (two pounds of water-soluble Diquat cation plus 0.9 pound of complexed copper) to destroy duckweed as thick as it was on Bayview Lake and on parts of the Black Warrior River. But the invert emulsion requires, at most, only half as much active herbicide (1 pound of Diquat and 0.45 pound of copper per acre) to do the same job thoroughly. This reduces herbicide costs by 50 percent right at the start.

From his preliminary run in the small lagoon, Dr. Blackburn found that the increased effectiveness of his invert-spraying technique would permit a further significant reduction in active concentration. He used a level of 0.75 pounds of Diquat (with a proportionate reduction in Cutrine-Plus) per acre to give complete duckweed kill. This represents an overall reduction in herbicide use of more than 60 percent, compared with requirements for o/w emulsion systems employing the same active ingredient for the same application.

To control amount of herbicide used, Dr. Blackburn changes orifice discs. The two herbicides he used in this job, Diquat and Cutrine-Plus, were metered directly from their shipping containers through the orifice tubes into the system. This avoided the dangers of pouring and mixing these herbicidal solutions. (Dr. Blackburn feels the safety factor can't be emphasized strongly enough. He finds that most accidents associated with aquatic herbicides occur during the mixing procedure.)

Where necessary, he can feed one or two more solutions into the pump simultaneously, making it possible to homogenize as many as six input streams (up to four active solutions, plus invert oil and water) to form a stable invert emulsion.

Other applications. Besides similar duckweed projects elsewhere in the South, Dr. Blackburn employs a variety of emulsion systems to control such aquatic plants as water hyacinth, water lettuce, hydrilla, naiad, cattail, brush, and ditch-bank grasses. In most irrigation-canal situations, he uses a truck-mounted invert pump. With this setup, he can spray over 50 acres per day.



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People on the Move

Job changes in the Tennessee Golf Course Superintendents Association include: Jim Harris is at Richland County Club, Nashville; Howard Gardner is at Stones River Country Club, Murfreesboro; Joe Briguglio has moved from Brainerd Golf Club in Chattanooga to Lakewood Country Club in Tullahoma as pro-superintendent; Ray Blankenship is at Carnton Golf Club; and Chuck Chandler is at Cobbly Nob.





Pendell

Trov

Victor M. Cushing, vice president of marketing for Jacobsen Manufacturing Co., Racine, Wis., has announced the promotion of Jerome M. Pendell to the newly created position of director of communication planning and the appointment of William J. Troy as advertising and sales promotion manager.

Max Yost is the new superintendent at *Unity Village Golf* Course in Kansas. He is from Hutchison, Kansas, and is a graduate of Kansas State University.

Eddie Mena, formerly superintendent at Princess Acapulco Country Club, Acapulco, Mexico, is now back at his former club, Rancho Bernardo Country Club. Also in California, Barry Neals replaces Gene Stoddard as superintendent at Irvine Country Club. Chuck Whitacre is superintendent at Cherry Hills Country Club, Sun City. Dave Zahrte is superintendent at Candlewick Country Club, Whittier.

Wayne Ferris and Lee Dooley have joined the staff of *Mount Arbor Nurseries*, Shenandoah, Iowa. Ferris is general superintendent, and Dooley is data processing manager.

Jack Magnus has assumed full responsibility for retailing Mallin-ckrodt horticultural chemicals, Banrot and Truban, to the East Coast. He will align himself with the academic research community and participate in the testing of Mallin-ckrodt's specialty agricultural chemicals. The company is based in St. Louis.

In Indiana, Dwight Ladd has taken the superintendent position at Woodland Country Club in Carmel. He had formerly been superintendent at Guadalajara Country Club, Mexico. Also, Bill List is superintendent at Christmas Lake Golf Club in Santa Claus, Indiana.

Officers of the Western Chapter of the International Society of Arboriculture are: Clark O. Eads, president; Robert N. Berlin, president-elect; William L. Owen, vice president; and C. Elmer Lee, secretarytreasurer.

Officers of the Ohio Chapter of the International Society of Arboriculture are: Dr. Charles L. Wilson, Ohio Agricultural Research and Development Center, Wooster, president; Blair E. Caplinger, Nelson Tree Service, Inc., Dayton,

president-elect; Ralph M. Veverka, Division of Shade Trees, Cleveland, vice president; Dr. Davis T. Sydnor, Department of Horticulture, Ohio State University, executive secretary; and Dr. Bruce Roberts, Shade Tree and Ornamental Plant Lab, Delaware, editor.

In California, Charles Amos has left California Country Club to become superintendent at Hacienda Country Club, La Habra; Don Clark, superintendent at Meadows Country Club, Escondido, Calif., is now at Escondido Country Club.

A number of superintendent job changes have taken place in North Carolina: Lowell Pennell is at Asheville Municipal Golf Course; C. B. Kelly is at Sea Scape, Kitty Hawk, N.C.; Lew Dexter is at Duplin Country Club, Warsaw; Paul Baker is manager-superintendent at South Granville County Club, Creedmoor; Johnny Lee Sides is at Minorcas Creek Golf Club; J. Don Burns is at Biltmore Forest Country Club, Asheville; and Boots Berckemeyer is at Pine Valley Country Club, Wilmington.

George A. Lawrence has been named general manager of the Agricultural Chemicals Division of *Diamond Shamrock Corp.*, Cleveland. He is responsible for research, operations and marketing the company's line of agricultural and turf care products.





Lawrence

Thurmond

Eastern regional sales manager for Rain Bird Sprinkler Manufacturing Corp., Glendora, Calif., Ken Mills, has announced that Robert Thurmond has joined the company as southwest district manager. He will be working with both agricultural and turf accounts.

Tom Matthews is superintendent at Aurora Country Club, Aurora, Ohio.

R. Earl Dowell, superintendent at Lafayette Country Club in Indiana has retired after 29 years at the club. He started at the club in 1947 when it was a nine-hole facility. It now has 27 holes. His course has been involved with much experimental work, including Dr. William Daniel's Purdue work with calcine clay, tricalcium arsenate and zoysiagrass. He also trained many young men including GCSAA director Charles Tadge, Dave Fearis, Dave Wahn, Ron Graves, Steve Gibson, Bob Brame and Lee Overpeck among others.

Officers of the Texas Society of Landscape Architects are: John F. Teas, president; Steven D. Dodd, Jr., vice president; and Charles F. Heinselman, secretary-treasurer. Directors are: Mancill Allen, John P. Classen, Jr., Albert T. David, Robert W. Caldwell, James A. Foy, Jr., Gratz C. Myers, Jr., and F. O. Smith, Jr.

Dr. A. J. Powell has been appointed to the faculty of the University of Kentucky's Department of Agronomy as the extension specialist in turf. His responsibilities in applied research and extension cover all areas of turf management.

Henry C. Wetzel is superintendent at St. David's Golf Club near Philadelphia. He is the son of longtime superintendent Heinie Wetzel and is a graduate of Delaware Valley College of Science and Agriculture. He was most recently superintendent at Holly Hills Golf Club, Alloway, N.J.

Sprinkler Irrigation Association, Silver Spring, Md., has announced an appointment and an award winner. Thomas J. Schiltz has been named director of education and technical services. Walter W. Hinz, extension agricultural engineer at the University of Arizona, was named recipient of the association's "Man of the Year" award.

Gary J. Aagesen has been named technical service representative for the state of Wisconsin by Chemagro Agricultural Division, Kansas City, Mo.

James R. Smith has been promoted to director, market development, agricultural marketing services and planning for Elanco Products Co., Indianapolis. M. Phillip Davis has been transferred and promoted from agricultural sales trainee in Clemson, S.C. to sales representative working out of Raleigh, N.C.





Smith

Thomas E. Evans has been appointed director of marketing, Agricultural Business Group, Velsicol Chemical Corp., Chicago. He was formerly national sales manager of the Professional Pest Control Department at Velsicol. He began his career with Velsicol in 1960 as Consumer Products sales representative in Ohio, Kentucky, Michigan and Indiana and was later promoted to market manager in that same department.

At the conclusion of a recent banquet. Gerald D. Schade. Shade & Sun Nursery, Stormville, N.Y. was inducted into the New York State Nurserymen's Association Hall of Fame. The presentation was made by Mal Downie of Rosedale Nurseries, Inc., Hawthorne, N.Y.





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Forklifts Speed Landscaping, Help Control Costs

Machines that became an operational necessity with the advent of palletized sod have since proved a key element in the growth of a Chicago-area landscape contractor. By deploying a spread of rough-terrain forklifts to handle sod and a variety of nursery stock on its projects, the contractor has speeded work and controlled costs on its landscape contracts.

Forklifts became a required tool for Lawrence & Ahlman, Inc., Dundee, Ill., when Chicago-area sod growers began handling sod rolls on pallets to help overcome labor shortages and spiralling costs. Prior method was all by hand, proving both time consuming and costly for sod farmer and landscaper.

Since pallets, the contractor dispatches its four forklifts to sodding projects to unload and strategically place sod pallets for its crews to go to work.

But while the machines performed their primary function of pallet handling, the contractor saw additional material handling assignments that would increase versatility on the job and free other equipment for additional tasks. In addition to unloading and spotting sod pallets, the forklifts are also used at Lawrence & Ahlman's yard and nursery for handling balled and burlapped nursery stock.

Lawrence & Ahlman tackles a job from design to finished product. Most of their work requires grade preparation for sodding or seeding and final landscaping. Once grading is finished and soil has been prepared, the contractor carefully plans remaining work to control costs and assure timely completion.

"The essence of a landscaping project, no matter what kind of job it is," says Ron Ahlman, co-founder and vice president, "is speed. Sod, more than any other product, is a highly perishable commodity, and if left rolled or unwatered, will soon smother and could die in just a couple of hot days. The idea is to get sod laid and new trees planted as quickly as possible."

To do that, sod transported to projects from the sod farm on a

tractor-trailer is quickly off-loaded by one of the forklifts on the job. On each 40-foot-long flatbed trailer, 14 pallets containing as much as 1,000 yards of fresh sod must be removed quickly to free the transport for other hauls. Each pallet can weight up to 2,800 pounds.

The forklift will remove and carry the first pallets to workmen for laying, then return to finish off-loading the trailer. The unit takes less than 20 minutes to completely remove pallets and station them nearby. Once the trailer is off-loaded, the forklifts are used to lift and carry pallets to the landscaping crews.

The contractor assigns an average crew of six men for each 1,-000 yards of sod that has to be placed and estimates each crew can place up to 2,000 yards in a normal eight hour shift. Trees and shrubs are planted by at least two men, depending on the size and weight of the plant.

All sodding projects require at least one forklift to handle pallets and assist crews. Lawrence &

please turn page

Above: As the forklift backs slowly down the roadside, two installers drop and evenly space rolls of fresh sod.

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Forklifts from page 36

Ahlman recently completed an environmental project along a 2½ mile stretch of Route 68 near Arlington Heights, Ill. The job called for installation of 40,000 square yards of sod in the median strip and along the right-of-way of the recently improved highway.

To handle the project, Lawrence & Ahlman sent a 10-man crew equipped with utility truck, an International tractor loader and one of its forklifts. On a typical day the crew moved into action with the forklift maneuvering in and out of traffic, carrying pallets of sod to the installers.



Two or more workmen removed sod rolls from the pallet, dropped and spaced them evenly as the fork-lift backed slowly down the road-side. The rest of the crew followed along unrolling and fitting the strips of sod. Once the pallet was empty, the forklift then tracked 200 yards back to a nearby parking lot to pick up another pallet of fresh sod.

The tractor loader on the job site preceded sodding operations by clearing and grading sections that had to be landscaped. Later in the day, once large enough sections were sodded, Lawrence & Ahlman's tanker made several sweeps past spraying the freshly greened areas with water.

A few miles south of the highway project a second Lawrence & Ahlman crew was completing sod installation of an open space in the center of a new apartment development. The second project called for 7,000 square yards of sod and required an eight-man crew along with another of the contractor's forklifts.

The rough terrain forklifts in Lawrence & Ahlman's equipment spread have proved to be an integral factor to the contractor's successful operations. The machines are an effective time and money-saver and their use on many projects frees wheel loaders for other assignments.

"Forklifts are ideally suited to landscaping operations," attests Ahlman. "Each of these units easily handles sod pallets weighing up to 1½ tons, and can negotiate a site to place loads where we need them, saving considerable time and expense.

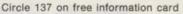
"Many times, we're at a site that has obstructions like curbs or timber. Using pallets and the forks to lift-and-carry eliminates the need for a crew to help fill a wheel loader's bucket. And these roughterrain forklifts climb a curb with no trouble at all. Because of their versatility, we can schedule equipment for other uses and eliminate idle machine time."

The units are equipped with manual shuttle transmissions and can safely lift up to 4,000 lb. Each machine is equipped with a 42 hp Perkins gas engine and two-stage 10 foot mast. The units Lawrence & Ahlman use are manufactured by Massey-Ferguson, Inc., Des Moines, Iowa.

Lawrence & Ahlman began operations 17 years ago, specializing in residential landscaping. Since then, the contractor has grown to an annual contract volume exceeding \$1 million. During peak months the company employs more than 100 people and operates primarily within a 75-mile radius of metropolitan Chicago.

The contractor's projects vary from municipal contracts, highway sodding and planting, to golf courses, industrial parks, shopping malls, and university campuses. Sod, tree and shrub planting comprise the bulk of Lawrence & Ahlman's material handling requirements and call for mobile equipment to handle and place the stock on the job.







Forklift picks up a fresh pallet of sod to carry 200 yards up the road to installers.