

which sink to the bottom, the amount of copper which actually gets into solution is much lower than the expected theoretical value. We suspect that this is associated with absorption by bottom muds.

2. Copper which does get into solution in the water, mixes rapidly throughout the entire depth of the pond and does not form a uniform, heavy concentration near the bottom.

3. If copper sulfate is dissolved in water and applied to the surface of a pond, the amount of copper found in solution in the pond is greater than if the copper sulfate is applied in granulated form.

4. A heavy bloom of algae appears to have the capacity to rapidly reduce the amount of copper in the water of a treated pond.

## Herbicides Offer

### Practical Weed Control For Industrial Sites

In most cases, weed control by herbicides is cheaper and more effective around industrial areas. The main consideration is using chemicals safely, a Humble Oil and Refining Company official said during the recent Industrial Weed Control Conference at Texas A&M University, College Station, Tex.

The official, James W. Hammond of Houston, said Humble found that it could save about 60 percent in costs by utilizing herbicides over hand and machine cutting. The herbicides also removed fire-spreading stubble.

"Chemical method of weed control is a way of industrial operation," he said. "Therefore, we need to learn to use these substances safely."

Hammond, director of industrial hygiene for Humble, said the firm's review of herbicides included more than 90 different commercial chemicals and several hundred mixtures of these substances. Those selected combined safety and efficiency.

Factors other than worker's risk also were studied. These included livestock, land poisoning,

**Table III. Copper contents in ppm of pond water treated with granular copper sulfate to yield 0.50 ppm Cu. Applied 8/8/66.**

Pond	Depth	Time in Days					Initial Content
		1	2	4	7	9	
D	Top	0.05	0.04	0.03	0.02	0.01	0.01
	Bottom	0.09	0.04	0.03	0.02	0.01	
E	Top	0.04	0.03	0.03	0.03	0.01	0.01
	Bottom	0.04	0.03	0.02	0.02	0.02	

**Table IV. Pond C—Treated with granular CuSO<sub>4</sub> August 23, 1966 to yield 0.375 ppm Cu.**

	Copper, ppm			
	Surface	2 Feet	4 Feet	6 Feet
Initial (before treatment)	0.01	0.03	0.02	0.01
1 Hour	0.10	0.11	0.09	0.11
2 Hours	0.11	0.13	0.17	0.09
4 Hours	0.11	0.11	0.15	0.17
24 Hours	0.11	0.11	0.11	0.11

**Table V. Copper contents of pond waters treated with copper sulfate to yield 0.50 ppm Cu. Applied in solution form to water surface. Treated September 6, 1966.**

		Copper, ppm					
		Initial	2 hrs.	4 hrs.	24 hrs.	48 hrs.	72 hrs.
Pond D	Top	0.05	0.42	0.31	0.26	0.23	0.19
	Bottom	0.03	0.22	0.20	0.20	0.21	0.20
Pond E	Top	0.05	0.14	0.14	0.13	0.11	0.11
	Bottom	0.03	0.06	0.06	0.13	0.13	0.09

economic crops, fish and wildlife, children and pets.

He said there are ways to measure worker exposure to chemicals. Urinary lead, arsenic, mercury, pentachlorophenol and dinitrophenol are related to exposure levels. These results, like the anti-cholinesterase agents, may be used to keep tab on degree of exposure on an integrated basis.

Organic herbicides, Hammond said, have a minimum degree of hazard associated with normal use. Chemical manufacturers give sufficient data on container labels to allow use without danger.

"As with all chemicals, human, livestock, wildlife, fish and economic plant exposures should be carefully evaluated on each application," the speaker cautioned.

"These exposures should be kept to the minimum practical to

accomplish the task at hand."

The Humble official outlined precautions to take in protecting eyes, skin and lungs. And he also touched on the subject of public liability.

"Some substances, like the hormone types, carry more public liability than others because of the danger of drifts to economic crops and by producing unpalatable flavor in drinking water and the fish that may live in these streams and lakes," Hammond said.

Another speaker, Roy S. Rodman, supervising landscape architect for the Texas Highway Department, said Texas highway landscaping can be divided into four broad classes: Erosion control, landscaping, wildflowers and rest areas.

Of primary importance is establishment of grass or turf on

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unpaved areas of the right-of-way. Not only does turf prevent erosion, but it also provides a neat, attractive highway.

"Our thinking is that a good turf with a minimum number of large trees and shrubs, well maintained, is roughly nine-tenths of the aesthetic qualities, and that all other additions in plantings are more or less frosting on the cake," Redman said.

One of the most popular features of Texas highway landscaping, he added is the preservation and protection given to native wild flowers. It is common in the spring to see the right-of-way blanketed in various shades of blue, red, white and other colors as far as the eye can see.

"But we have learned that we cannot have our wild flowers and a heavy turf," the speaker said. "Also, we cannot have our wild flowers in the urban areas because we must mow too often to permit the plants to reseed, as a higher type of maintenance is required.

A major problem, Rodman emphasized, is weed control around sign posts, guard posts, bridge abutments and other tight spots along rights-of-way. Mowing equipment cannot do the job. Experiments are being done with chemicals.

"At this time, as far as my knowledge is concerned, I do not think there is a chemical on the market that will accomplish the control that the department would like to have for these areas. The reason I make this statement is that we can establish a pure stand of any particular grass during construction and within a period of three or four years, you would be surprised at what you will find growing in that area.

"All the trucks traveling the highway, the wind that we have in this state, and the water carrying the additional seed from adjoining areas, will bring in vegetation which you do not desire, and it is almost impossible to eliminate," the landscape architect explained.

## Insect Report

WTT's compilation of insect problems occurring in turfgrasses, trees, and ornamentals throughout the country.

### Insects of Ornamentals

#### SPOTTED CUCUMBER BEETLE

(*Diabrotica undecimpunctata howardi*)

**Alabama:** Adults heavy and widespread on camellias, chrysanthemums, and many other blossoms throughout Mobile County; adult feeding heavy on late rose blooms and other blossoms this fall and early winter throughout southern and central areas.

#### ALFALFA LOOPER

(*Authographa californica*)

**California:** Moderate on chrysanthemum nursery stock in Half Moon Bay, San Mateo County.

#### AN ARMORED SCALE

(*Rhizaspidiotus dearnessi*)

**Florida:** All stages on some partridge-pea (*Cassia* sp.) plants at Stuart, Martin County.

#### ARMORED SCALES

**Florida:** *Lepidosaphes maskelli* severe on stems and leaves of variegated juniper inspected at nursery in Winter Haven, Polk County. *Gymnaspiis aechmeae* adult damage severe on leaves of billbergia at nursery in Brooksville, Hernando County; plants under quarantine. Adults infested 60 of 100 bromeliad torch plants at nursery in Lake Worth, Palm Beach County. *Pseudaonidia clavigera* moderate to severe on all common and sasanqua camellias at nursery in Tampa, Hillsborough County. **California:** *Diaspis cocois* heavy on palm in Carpenteria, Santa Barbara County. *D. echinocacti* heavy on cactus nursery stock in Yucca Valley, San Bernardino County; very active in 1967. *Aulacaspis rosae* heavy on roses in Gonzales, Monterey County. *Parlatoria oleae* heavy on lilac nursery stock in Santa Maria, Santa Barbara County.

#### CAMPHOR SCALE

(*Pseudaonidia duplex*)

**Florida:** Found on stems and leaves of camellia at nursery in Suwannee River area, Gilchrist County, November 30; all females parasitized. This is a new county record.

#### YELLOW SCALE

(*Aonidiella citrina*)

**Florida:** All stages moderate on leaves on 40 of 200 Japan fatsia plants at nursery in Apopka, Orange County; controls recommended. This is a new host record.

#### WHITEFLIES

**New Mexico:** Heavy on poinsettias in 2 commercial greenhouses in northern area; foliage discolored.

### Tree Insects

#### WHITE-PINE APHID

(*Cinara strobi*)

**Virginia:** Active on white pine in Prince Edward County; severe discoloration in Charlotte, Pittsylvania, and Orange Counties. **Maryland:** Eggs heavy on several young white pines at Fallston, Harford County.

#### BARK BEETLES

**Virginia:** *Dendroctonus* spp. active in City of Chesapeake, and in Orange, Westmoreland, and 14 southern counties; *Ips avulsus* major pest in October although *D. frontalis* generally very active. *D. frontalis* killed loblolly pine in one-acre spot in King William and Chesterfield Counties; active in small spots in Nottoway and Lunenburg Counties.

#### PINE SAWFLIES

(*Neodiprion* spp.)

**Virginia:** *N. lecontei* larvae active on some loblolly pines in Westmoreland, King George, and Pittsylvania Counties; damage averaged 0.9 percent of total sample of trees in observation areas. *N. pinetum* found on several white pines at 2 locations in Orange County.

#### AN ARMORED SCALE

(*Aspidiotus cryptomeriae*)

**Maryland:** Collected from Canadian hemlock by C. W. McComb at Rockville, Montgomery County. This is a new state record.

#### AN ARMORED SCALE

(*Clavaspis ulmi*)

**California:** Light on catalpa trees in Burlingame, San Mateo County.

#### PINE TORTOISE SCALE

(*Toumeyella numismaticum*)

**Iowa:** Infesting pine at Wadena, Fayette County. **Virginia:** Light on 6 Virginia pines at Frederick County location.

#### PINE WEBWORM

(*Tetralopha robustella*)

**Virginia:** Common or scattered plantation seedlings in Lunenburg and Bedford Counties. **Florida:** Larvae locally infesting leaves of 47 of 471 loblolly pines in Plant City, Hillsborough County.

#### WHITE-PINE WEEVIL

(*Pissodes strobi*)

**Virginia:** Damage light to 3 plantations in Giles and Craig Counties. Damage averaged 1 percent of total sample of trees in observation areas; static population indicated.

Compiled from information furnished by the U. S. Department of Agriculture, university staffs, and WTT readers. Turf and tree specialists are urged to send reports of insect problems noted in their areas to: Insect Reports, WEEDS TREES AND TURF, 1900 Euclid Ave., Cleveland, Ohio 44115.