relish the tuberous roots of some species of arrowhead, hence the common names of duck potato or swamp potato are used in some parts of the country.

Water smartweed, *Polygonum amphibium*, is a member of the buckwheat family, Polygonaceae. The quickest way to confirm identification of a smartweed, when a pink, white, or greenish flower spike is seen along with alternating lanceolate leaves, is to check the jointed stem. If there is a sheath or stem extension at the base of each leaf petiole covering each joint or node, it is a *Polygonum*.

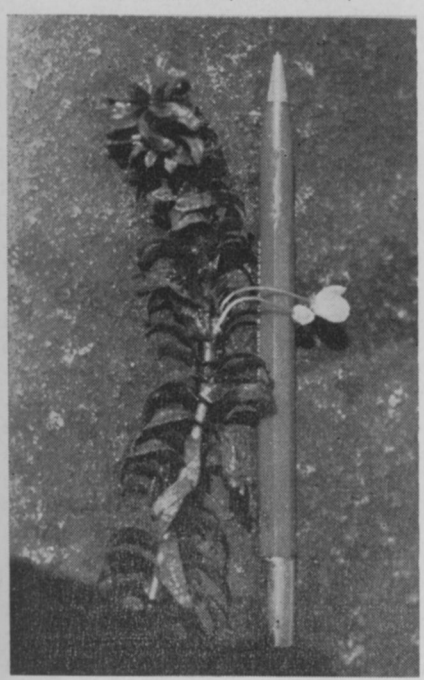
Smartweed species are generally distributed over the United States.

Waterprimroses, *Jussiaea* spp., are members of the evening-primrose family, Onagraceae. Waterprimrose is a rooted emergent genus. Species of waterprimrose (*J. repens* var. *glabrescens*, *J. californica*, and *J. grandifolia*) form mats of vegetation due to the air-holding capacity of stems. Roots are embedded in marginal shallow areas, and vast mats spread outward from the shoreline. Leaves are willowlike; long and slender. Flowers have 5 yellow petals, and are borne in the axils of leaves. The fused petals form a long tube connecting the flower stalk with the open petals. The ovary is long and slender and produces many seeds. Waterprimrose has an underground stem which sends up new shoots intermittently.

Waterwillow, *Justicia* (*Dianthera*) *americana*, (An alternate genus or species in parentheses indicates that either name may be found in texts depending upon date of publication. The first name is preferred.) has leaves similar to true willows (*Salix* spp.), but waterwillow, being herbaceous in nature, is not related to the woody species. This member of the family Acanthaceae is widespread throughout the eastern half of the United States.

Waterwillow is a perennial with thick creeping rootstocks. It reaches a height of about 5 feet. Leaves are willowlike, opposite on the stem and entire (not toothed or scalloped around the edges). Flowers are purple. Waterwillow is found nearer the edge of a lake or pond and does not spread lakeward. It can also survive out of water, but thrives when partly submerged.

Brazilian elodea (*Elodea densa*)



Submersed Weeds: Anathema To Boaters, Swimmers, Fishermen

Submersed aquatics are the second group of important weeds. These weeds usually grow entirely under water, but leaves may reach the surface when growth is dense. They may or may not be rooted. Submersed aquatics do not have enough supporting tissue in their stems to maintain an erect posture out of water. Many submersed species do develop short flower stalks which may extend above the water surface for fertilization. This is an ephemeral occurrence and reproductive parts usually bend into the water after pollination.

Submersed weeds are the most troublesome group of aquatic plants that occur in irrigation and drainage ditches. Underwater weeds clog waterways, collect silt, and reduce flow to agricultural fields under irrigation.

One of the most common submersed aquatics is *Elodea* (*Anacharis*) spp., sometimees simply called waterweed. Sinc waterweed is such a nondescriptive term, we shall refer to this weed as elodea.

Elodea is a favorite "seaweed" for use in goldfish bowls. Although it is normally rooted, it is easily fragmented and can survive as a floating plant or plant parts. This factor is important when controlling weeds of this sort. Chaining and plowing do not kill it, but merely spread the infestation.

Elodea is normally found in calcareous or hard water, water which contains dissolved calcium minerals. It grows rapidly, frequently branching from nodes. Each node is represented by a

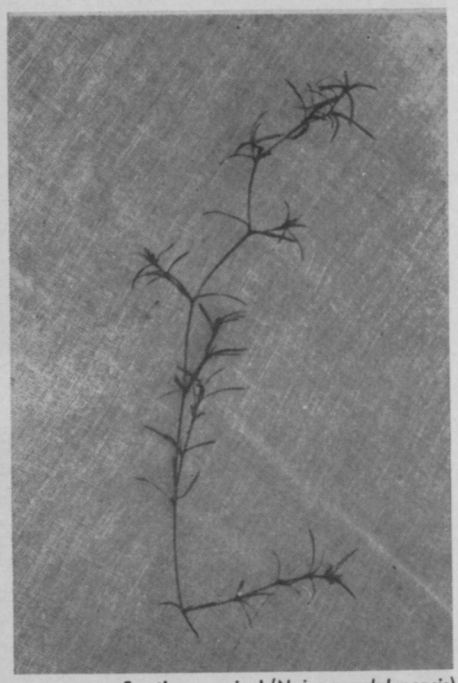
Arrowhead (*Sagittaria* sp.) Staff photo.

Pickerelweed (*Pontederia cordata*)

Arrowarum (*Peltandra* sp.) Staff photo.

Waterprimrose (*Jussiaea grandiflora*) below.

Coontail (*Ceratophyllum demersum*)



Southern naiad (*Najas guadalupensis*)

Watershield (*Brasenia schreberi*). Staff photo.

whorl (circlet) of leaves described as straplike, relatively long and flat. Often the stem grows to such a length that it breaks, and sends out new roots to become established in another place. Vegetative propagation is the prominent means of reproduction, although elodea does reproduce by seed. Sometimes male and female flowers are found on the same plant. Flowers are small and inconspicuous, found growing near stem tips. While developing, the flowers grow on slender filaments to the surface where pollination may take place.

There are two common species of *Elodea*. Most widespread is *Elodea canadensis*, American elodea. This native North American plant became a pest of waterways in Europe soon after it was introduced there.

Elodea densa, Brazilian elodea, is a large species introduced from South America. It is commonly used in aquaria and outdoor pools. It has adjusted to the wild and is now found throughout North America. As the name suggests, leaves grow in a dense whorl around the stem.

Watermilfoils "Smother" Oysters

Another troublesome weed of inland lakes and coastal flats is watermilfoil, family Haloragidaceae, genus *Myriophyllum*. There are about 20 species of this important aquatic weed. Stems of watermilfoil are not greatly branched; leaves occur either in whorls or are alternate on stems. Leaves are finely dissected (featherlike) or branched.

One very important pest species, parrotfeather, *Myriophyllum brasiliense* (*proserpinacoides*), was introduced from South America. It is common along streams, brooks, drainage and irrigation ditches. Reproductive structures and foliage of parrotfeather protrude above the water. It is a pest along the east coast, in Florida and California. Beds of watermilfoil have been known to be so thick that herbicide granules could not penetrate the mat of weeds.

Various watermilfoils have adapted to different water types. No single general statement can be made regarding water and its relationship to milfoil. Some are adapted to hard water and are usually found over a limestone bed. Others are found in noncalcareous waters, and one imported species, eurasian watermilfoil (*M. spicatum*), has adapted to living near the sea in water intermediate in salt content between sea water and fresh water. In these areas, heavy stands of eurasian watermilfoil interfere with oyster farming by killing young oysters and hampering harvesting operations. Thick mats impede water movement, reduce microscopic oyster food, and lower water oxygen content (Steenis and Stotts, 1961). This weed is also a pest in some inland waters.

All watermilfoils are basically alike in that they have very fine, feathery leaves. They are all "rooted" to the bottom by a weak horizontal underwater stem from which new plants sprout.

Coontail, *Ceratophyllum demersum*, is a notorious member of the

Cabomba (*Cabomba caroliniana*)

family Ceratophyllaceae. Coontail is found in every state in the country. It will be found in lakes and ponds where there are sufficient nutrients and organic matter. Wherever it grows, it is usually a plentiful and dominant species.

Recognized by the stem with whorled leaves which bears a resemblance to the tail of a raccoon, coontail has fine forked, pointed leaves. Each leaf in the whorl radiating from the stem has "teeth" or barbs along one edge. This characteristic identifies coontail readily. Coontail appears olive green when viewed through clear water.

Coontail has no roots but is often found with its basal stalk embedded in soft mud early in

ORTHO® is Proud to Announce A New Aquatic Weed Control that Really Works!

ORTHO DIQUAT

Public officials, ranchers and crop growers have long felt the need for a potent weed-killer practical enough for large-scale control of aquatic weeds. A weed-killer that was not toxic to wildlife and livestock when used according to directions. One that wouldn't contaminate the soil or cause contamination when treated water was used for irrigation. One that was economical, and easy to apply. New DIQUAT, *recommended by many agricultural agencies, represents a successful solution to these problems.*

Fast kill on a wide variety of weeds. DIQUAT is highly soluble, and moves in quickly for the kill. (Much faster, for instance, than 2,4-D.) Weeds absorb it rapidly, then wilt, collapse and die. And the kill covers a wide range of aquatic weed pests: waterlettuce, waterfern, water hyacinth, elodea, southern naiades, pondweed —in fact, preliminary tests show DIQUAT to be effective against at least 22 of the more common aquatic weeds.

Low hazard, and non-contaminating. (Used as directed.) DIQUAT greatly reduces hazards to applicators, wildlife, etc., when properly used as recommended. Residue contamination is not a factor, as DIQUAT does not build up in water, and is inactivated immediately on contact with soil.

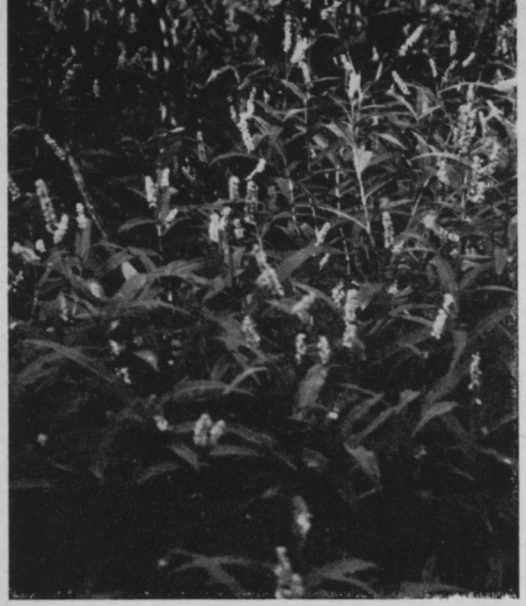
Hundreds of practical applications. Because of its proven effectiveness and inherent safety, DIQUAT has a wide variety of possible applications. It can be used to control weeds in canals, lakes, drains, and ponds. In parks, or on farms or ranches, it can be used for drainage and irrigation ditches, ponds, marshes, and swamps.* DIQUAT is also an excellent non-selective control for weeds and grasses around buildings and along fences, ditch banks and roadways.

***Note:** As with many chemicals, water treated with DIQUAT should not be used for swimming or drinking purposes until ten days after application. And since it is a herbicide, allow ten days before spraying, irrigating or other uses of treated water.

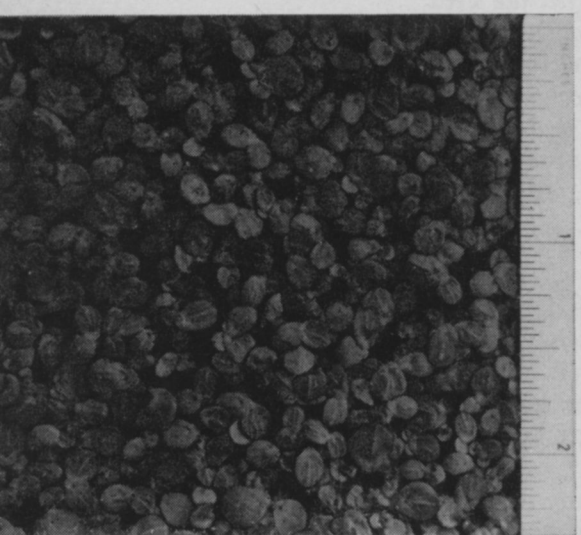
A special word to Municipal Officials: It goes without saying that you can't make an important policy decision on the basis of one advertisement. But we believe that the technical data available will convince you that DIQUAT can provide safer, more effective and more economical weed control. Why not get the full story, by writing: C. E. Cody, National Sales Manager, Agriculture, California Chemical Company, Ortho Division, 200 Bush St., San Francisco, Calif.

ORTHO®

"Helping the World Grow Better"



Smartweed (*Polygonum* sp.) Staff photo.



Spirodela (*Spirodela* sp.)

Spatterdock (*Nuphar advena*)

Chara (*Chara* sp.) below.

the growing season. Late in the summer, mats of coontail will float on the surface and drift with wind and water currents. This weed may collect in one portion of a pond or lake and make it entirely unusable for recreational purposes (Hiltibran, 1961).

An aquatic weed which could, at a hasty glance, be taken for coontail is *Cabomba caroliniana* or fanwort. Cabomba is classed by some as a member of the waterlily family, Nymphaceae. It, too, grows entirely submersed. Close observation reveals that leaves are finely divided, but are more fanlike and blunt tipped. They do not have "teeth," as does coontail. Leaves are attached oppositely to the stem rather than in whorls; they are covered with a gelatinous slime, typical of some waterlilies. Cabomba grows entirely under water except from May to September when the plant sends tiny white flowers to the surface along with tiny peltate (shield-shaped) leaves which give a clue as to waterlily kinship.

Sago is Toughest Pondweed

Next on the list of submersed aquatic weeds are the pondweeds, *Potamogeton* spp. Most widely known and toughest to control is sago pondweed (*Potamogeton pectinatus*). Found in nonacid waters (neutral to alkaline, pH 7 or above) in all states, sago pondweed is responsible for blocking flow in thousands of miles of irrigation ditches.

Sago pondweed is a limp, rooted species which bends freely in moving water. Leaves are rounded in cross section, threadlike, taper to a point, and fan out in water. Sago pondweed is a bushy plant and should not be confused with those pondweeds which have long strandlike leaves that float in water.

Widespread over the United States, sago pondweed is one member of the pondweed family which cannot be killed by applications of sodium arsenite (Hiltibran 1961). Therefore, a recognition of this pest is necessary so that adequate control measures can be applied. Other pondweeds with tuberous roots may be difficult to kill with contact herbicides.

The leaves of other Potamogetons vary in form from broad floating leaves to very narrow and submersed leaves and in some species foliage will vary on the same plant. All pondweeds have a flower spike which extends above the water from the mainstem. Their description and identification are very difficult.

Only a few of the more distinctive Potamogetons will be described here. If others are encountered, a textbook key should be used to confirm membership at least to the genus Potamogeton. A county agent or agricultural experiment station can also be helpful when doubtful species need identification.

Curlyleaf is Crispy

Curlyleaf pondweed, *Potamogeton crispus*, as its name indicates, has curled, wavy leaves, a crispy texture, and fine "teeth" along leaf edges. Curlyleaf pondweed is common in temperate United States and extends its range south to Tennessee and Alabama and west to California. It will thrive in hard, muddy, or brackish water.

Another group of submersed pondweeds is the fine-leaved species. These have grasslike leaves which are variable as to the shape of the tip and the type of venation. Leaf edges of fine-leaved pondweeds are entire (smooth) as opposed to the naiad, *Najas* spp., which also has fine leaves, but is finely toothed along both edges.

Naiads: Bushy Pondweeds

Naiads, *Najas* spp., are of the family Najadaceae, although some authors include them in the same family with Potamogetons (Fassett, 1960). Naiads are collectively called bushy pondweeds; they do not exhibit as much variation within the genus as do Potamogetons.

In general, naiads are more uniform plants. Leaves are opposite and somewhat regularly spaced; all leaves are pointed and widen near the base. All species are submersed and there is no leaf variation on individual plants as there is in the Potamogeton pondweeds. Naiads flower from axils of leaves.

Two species which are most widespread and troublesome are southern naiad, *Najas guadalupensis*, and slender naiad, *N. flexilis*.

Southern naiad ranges along the Atlantic and Gulf coasts extending northward through the Mississippi basin onto the Plains and North Central States. It is also common in shallow waters in California. Southern naiad has fine teeth on both edges of leaves. All naiads have a widened base but some taper gradually; some have lobes. Southern naiad tapers gradually to the stem. Its dull seeds are pitted across the middle with

If you can't find the herbicide you're looking for in the new Residex Catalogue – try this.

The new Residex catalogue provides technical information, prices and product listings for our complete line of 19 herbicides, especially formulated for industrial weed-control operations.

Since 1954, Residex has pioneered in distributing superior weed and turf products for custom applicators.

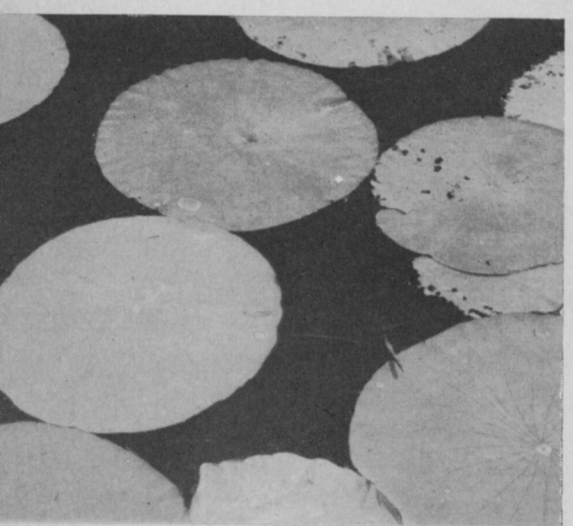
Why not use *our* experience to help you get started in this new and profitable field. Let us first help analyze your weed problems. Then, let us supply the specific herbicide, or mixture of herbicides, to *solve* the problem quickly and economically. Start cashing in on the weed and turf market now. Call or write today.

With this Residex Catalogue on hand,
you'll never end up pulling weeds by hand.

RESIDEX
CORPORATION
225 Terminal Avenue, Clark, New Jersey

Fragrant waterlily (*Nymphaea odorata*)

Waterhyacinth (*Eichhornia crassipes*)



American lotus (*Nelumbo lutea* (*pentapelta*))

Waterlettuce (*Pistia stratioites*) below.

10 to 20 rows of coarse pits. (Hiltibran 1961).

Slender naiad, *Najas flexilis*, also has "toothed" leaves tapering at the base, but seeds are shiny with very fine pits. Slender naiad is a temperate species; it thrives mainly in northern states, ranging westward to the cooler Rocky Mountain and Northwestern States. It is not found in the Plains States.

Any of the several naiad species may be confused with *Elodea* if the naiads appear in closely tufted, shortleaf form. Differentiation is determined by the pointed tips and wider leaf bases of *Najas*, which also has "toothed" leaf edges and flowers in leaf axils.

Final group of submersed weeds to be considered is algae. Algae are free-floating, one-celled, colonial or filamentous, nonflowering plant organisms. A general greenish coloration is imparted to water when algae are present in excess. Sometimes a typical fishy odor will lead one to determine that algae are responsible for the lessened desirability of a lake or pond for recreation.

Increased growth of algae frequently occurs as the result of fertilizer applied to water to increase fish-growing capacity. Generally, the application of fertilizer to ponds already containing higher aquatic weeds is not a good practice. Frequently with the decomposing of higher weeds following herbicide application, algae, because of lessened competition for nutrients, cause water to become sickly green and rather unattractive.

Exact identification of planktonic and filamentous algae is not always necessary because these can generally be controlled with properly applied amounts of copper, such as copper sulfate, also called blue vitriol or bluestone.

One filamentous species which is more difficult to control, and may require more than an inorganic mineral treatment, is *Pithophora* sp. This alga is typical of filamentous types; it grows attached to rocks and other plants. Cells form long, branched, "strings" which resemble hair when wafted by currents. As with some other species already mentioned, *Pithophora* breaks attachments late in the season and masses on the water surface. At this time it is said to look like a mat of wet wool.

Chara spp. is a lower aquatic plant which bears a resemblance to some flowering weeds, but chara does not flower because it is an alga.

Recognized by typical primitive whorled branchlets, and its distinctive musky repulsive odor, chara or stonewort often marks the deepest point of water beyond which no other plants will grow. Beyond the chara line is the water zone which does not receive sufficient light to support rooted plant life (Odum 1959).

Chara is dark green, and very brittle. Since it inhabits calcareous water, it is often encrusted with lime deposits. Heavy stands of chara are said to have a softening effect on the naturally hard water. Presence of chara removes much of the calcium minerals from the water; minerals are apparently "attracted" to chara and held to the plant in an insoluble state. So although water may be suspected to be hard, it should be tested so that controls will be accurate. ("Hard" water is water with large amounts of dissolved calcium and magnesium salts, and high carbonate and bicarbonate alkalinity. Carbonates (CO_3) combine with copper and settle out, reducing the amount of copper for plant control.)

A close look with a hand lens should reveal the stem surface of chara to be ribbed or lined vertically. Chara is highly resistant to most chemicals, and may survive after death of other weeds. Accurate identification can predict this and accusations of job failure will be avoided.

Last group to be considered is surface or floating aquatic weeds. These may or may not be rooted; if rooted, leaves float or extend above the surface; if not rooted, leaves and flowers may stand erect from the floating mat.

One exception will be noted. Some waterlily species will be included in this group although they are rooted and some leaves stand erect, out of the water. Reason for inclusion is so that comparison of different leaf types necessary for identification will be easier.

The duckweed family boasts among its membership the smallest flowering plant and some other very tiny aquatic weeds.

Lemna minor, *Lemna* or common duckweed, is a very small light-green plant which floats on water and reproduces by lateral branching and splitting of the small leaves. Each plant (leaf) has one tiny root which hangs down into the water. Growth and

splitting are very fast and *Lemna* is able to cover a small pond in a short time if left unchecked. Small common duckweed plants are about the diameter of a lead pencil and will be seen near the shore protected from open water by larger plants. If common duckweed covers a pond, wind may cause the tiny plants to be blown to the windward side of the pond where they "climb the banks."

Other members of the duckweed family are *Spirodela* sp., giant duckweed, which has several rootlets hanging from the floating leaf. *Spirodela* is only slightly larger than *Lemna* and is usually red or purple on leaf undersides. *Wolffia* sp., watermeal, is nearly microscopic, has no roots, no leaves, and each plant looks like a green grain of sand or collectively as a green scum floating on the surface. It is the smallest flowering plant known.

Waterhyacinth: Expensive Weed

Waterhyacinth is probably the most undesired aquatic weed in Florida, the Gulf States, and California. Since its introduction as an ornamental and subsequent escape in the late 1800's into the inland waterways of Louisiana and Florida, cost of control has reached millions of dollars.

Waterhyacinth, *Eichhornia crassipes*, is a free-floating flowering plant which spreads mainly by vegetative reproduction, budding new offshoots from a parent plant in rapid order. Growth is in a rosette pattern; leaves are somewhat oval and are supported by a long petiole which is inflated and buoys up the plant. Fibrous roots extend into the water and absorb nutrients. New offshoots are bound to the parent plant by strong stolons. Flowers are very showy and attractive, colored white, blue, or violet; there are 6 petals fused into a tube at the base. Many flowers are borne on a single spike.

Waterhyacinth propagates so rapidly that mechanical control is often too slow to keep up with reinfestation. Excessively heavy growths clog canals so that navigation is precluded.

Waterlettuce, *Pistia stratioites*, is similar to waterhyacinth in that it is a floating plant, but it does not clog waterways as much because interplant underwater connections are weak and easily broken. Waterlettuce has a range similar to waterhyacinth except that it does not occur in California, but does occur in Arizona.

Fleshy, prominently veined leaves have a covering of short, fine hair which makes liquid chemical control difficult without a wetting agent (Weldon 1962).

Waterlettuce may sometimes be found stranded on mud flats at which time it will take root weakly in mud. This plant has a flower, but it is a very inconspicuous one and not necessary for identification.

Waterlilies, family Nymphaceae, are easily recognized by the large, floating leaves, or pads, and showy white or yellow flowers. There are 4 genera of importance in this family.

Leaf Structure Spots Waterlilies

Watershield, *Brasenia schreberi*, is the only species in this genus and is identified by the eliptical (peltate) floating leaf with the petiole, or leaf stalk, attached to the middle of the leaf underside. Watershield leaves have no split as do some other waterlilies. To confirm identification, leaf undersides and petiole are typically covered with a jellylike mucilage.

Watershield flowers are less conspicuous than larger waterlilies and not needed for identification purposes. Watershield is amply distributed throughout eastern United States and occurs locally in the Pacific Northwest.

American lotus, *Nelumbo lutea* (*pentapelta*), is also the only native species in this genus and is easily identified by the circular floating leaf which is connected to slender, horizontal roots by a stout petiole which joins the circular leaf in the middle. Leaves are somewhat depressed or saucer shaped, and very waxy to the touch. There is no split in leaves.

In the center of the lotus flower, made up of numerous pale-yellow petals, is the conical, fleshy receptacle in which seeds are formed. No other member of the waterlily family has such a conical receptacle; all others are globular.

Of the remaining two genera, spatterdock, *Nuphar advena*, and white waterlily, *Nymphaea* spp., identification may be determined by venation of the floating or erect leaves.

Both genera have variable leaves; that is, they vary from nearly circular to somewhat arrowhead shaped. Leaves of both genera have a split at the point where the petiole joins the leaf. Despite these similarities, overall venation of the leaves is different.

Nuphar or spatterdock has a

(*Continued on page W-36*)

Guide to Suppliers of Weed & Turf Chemicals

Weeds and Turf presents below its annual Guide to Suppliers of vegetation control chemicals for use by contract applicators in urban/industrial areas. There is a mixture of common and trade-marked names (indicated by an asterisk*). This has been unavoidable since usage and recommendations of researchers refer to a particular chemical by one or the other, depending upon the newness of the compound, whether its common name is easier to use, or industry acceptance. There will also be some differences of opinion over the inclusion or omission of certain chemicals under particular use categories. Here again confusion exists among reference sources. We have made our choices on the basis of most frequent mention in our surveys which preceded this compilation. Readers' comments and suggestions are invited to help us improve future editions. Keep this year's Guide handy for frequent use.

Advertisers in *Weeds and Turf* are listed in boldface type.

HERBICIDES

SOIL STERILANTS

AMITROLE

Amchem Products, Inc.
American Cyanamid Co.
E-Z Flo Chemical Co.
Hub States Chemical & Equipment Co.
Nalco Chemical Co.
Residex Corp.
Riverdale Chemical Co.
Southern Mill Creek Products Co.

*AMIZINE**

Amchem Products, Inc.

AMMONIUM SULFAMATE

Chapman Chemical Co.
Chipman Chemical Co., Inc.
E. I. duPont de Nemours & Co.
Miller Chemical & Fertilizer Co.
Nalco Chemical Co.
Residex Corp.
Southern Mill Creek Products Co.

*ATRAZINE**

California Chemical Co., Ortho Div.
Campbell Manufacturing Co.
Chapman Chemical Co.
E-Z Flo Chemical Co.
Geigy Agricultural Chemicals
Hub States Chemical & Equipment Co.
Neil A. Maclean Co., Inc.
Miller Chemical & Fertilizer Corp.
Nalco Chemical Co.
Niagara Chemical Div., FMC
Pest Control Equipment Co.
Prentiss Drug & Chemical Co., Inc.
Residex Corp.
Riverdale Chemical Co.
Southern Mill Creek Products Co.
Stephenson Chemical Co., Inc.
Thompson-Hayward Chemical Co.
York Chemical Co., Inc.

*BENZABOR**

U. S. Borax & Chemical Corp.

BORATE COMPOUNDS

Chipman Chemical Co., Inc.
Diamond Alkali Co.
E-Z Flo Chemical Co.
Industrial Materials Co.
Neil A. Maclean Co., Inc.
Nalco Chemical Co.
National Chemsearch Corp.
Smith Douglass Co., Inc.
Stephenson Chemical Co., Inc.
U. S. Borax & Chemical Corp.
Utility Chemical Co.

CALCIUM CHLORIDE

Dow Chemical Co.
E-Z Flo Chemical Co.
General Chemical Div., ACC
Hub States Chemical & Equipment Co.
Neil A. Maclean Co., Inc.
Miller Chemical & Fertilizer Corp.
Pittsburgh Plate Glass, Chem. Div.
Southern Mill Creek Products Co.
Stephenson Chemical Co., Inc.
Thompson-Hayward Chemical Co.

*CARBYNE**

Spencer Chemical Co.

*CHLOREA**

Chipman Chemical Co., Inc.
E-Z Flo Chemical Co.

DALAPON

Chapman Chemical Co.
Dow Chemical Co.
E-Z Flo Chemical Co.
Hopkins Agricultural Chemical Co.
Hub States Chemical & Equipment Co.
Neil A. Maclean Co., Inc.
Miller Chemical & Fertilizer Corp.
Nalco Chemical Co.
Residex Corp.
Riverdale Chemical Co.
Smith Douglass Co., Inc.
Southern Mill Creek Products Co.
Thompson-Hayward Chemical Co.

DIURON

California Chemical Co., Ortho Div.
Chapman Chemical Co.
Chipman Chemical Co., Inc.
E. I. duPont de Nemours & Co.
E-Z Flo Chemical Co.
Miller Chemical & Fertilizer Corp.
Nalco Chemical Co.
Residex Corp.
Southern Mill Creek Products Co.

ERBON

Chapman Chemical Co.
Dow Chemical Co.
Nalco Chemical Co.

ADVERTISERS
IN THIS MONTH'S WEEDS & TURF
ARE LISTED IN BOLDFACE

*FENAC**

Amchem Products, Inc.
Nalco Chemical Co.

*FENATROL**

Amchem Products, Inc.

HCA

E-Z Flo Chemical Co.
General Chemical Div., ACC
Southern Mill Creek Products Co.

MONOBOR-CHLORATE

E-Z Flo Chemical Co.
General Chemical Div., ACC
Southern Mill Creek Products Co.
U. S. Borax & Chemical Corp.

MONURON

Chapman Chemical Co.
Chipman Chemical Co., Inc.
E. I. duPont de Nemours & Co.
E-Z Flo Chemical Co.
Miller Chemical & Fertilizer Corp.
Nalco Chemical Co.
Residex Corp.
Southern Mill Creek Products Co.

*NOVEGE**

Dow Chemical Co.

PBA

Amchem Products, Inc.
E. I. duPont de Nemours & Co.
E-Z Flo Chemical Co.

*PROMETONE**

Geigy Agricultural Chemicals
Hub States Chemical & Equipment Co.
Neil A. Maclean Co., Inc.
Pest Control Equipment Co.
Prentiss Drug & Chemical Co., Inc.
Riverdale Chemical Co.
Southern Mill Creek Products Co.
Stephenson Chemical Co., Inc.
York Chemical Co., Inc.

*SIMAZINE**

California Chemical Co., Ortho Div.
Campbell Manufacturing Co.
Chapman Chemical Co.
E-Z Flo Chemical Co.
Geigy Agricultural Chemicals
Hub States Chemical & Equipment Co.
Lobel Chemical Corp.
Neil A. Maclean Co., Inc.
Miller Chemical & Fertilizer Corp.
Nalco Chemical Co.
Niagara Chemical Div., FMC
Pest Control Equipment Co.
Prentiss Drug & Chemical Co., Inc.

Residex Corp.
Riverdale Chemical Co.
Southern Mill Creek Products Co.
Stephenson Chemical Co., Inc.
Thompson-Hayward Chemical Co.
York Chemical Co., Inc.

SODIUM ARSENITE

Black Leaf Products Co.
California Chemical Co., Ortho Div.
Chapman Chemical Co.
Chipman Chemical Co., Inc.
E-Z Flo Chemical Co.
General Chemical Div., ACC
Hopkins Agricultural Chemical Co.
Hub States Chemical & Equipment Co.
Industrial Materials Co.
Lobel Chemical Corp.
Miller Chemical & Fertilizer Co.
Miller Products Co.
National Chemsearch Corp.
Niagara Chemical Div., FMC
Pennsalt Chemicals Corp.
B. G. Pratt Co.
Reade Manufacturing Co.
Residex Corp.
Southern Mill Creek Products Co.
Stephenson Chemical Co., Inc.
Thompson-Hayward Chemical Co.
Vineland Chemical Sales Corp.
Woodbury Chemical Co.

SODIUM CHLORATE

Chipman Chemical Co., Inc.
Hooker Chemical Corp.
Nalco Chemical Co.
Pennsalt Chemicals Corp.
Pittsburgh Plate Glass, Chem. Div.

TBA

Chapman Chemical Co.

TCA

Chapman Chemical Co.
Dow Chemical Co.
E-Z Flo Chemical Co.
General Chemical Div., ACC
Nalco Chemical Co.
Residex Corp.
Robeco Chemicals, Inc.
Southern Mill Creek Products Co.

TRITAC*

Hooker Chemical Corp.
Thompson-Hayward Chemical Co.
U. S. Borax & Chemical Corp.

URAB*

General Chemical Div., ACC

UREABOR*

U. S. Borax & Chemical Corp.

UROX*

General Chemical Div., ACC

VACATE*

Diamond Alkali Co.
Riverdale Chemical Co.
Southern Mill Creek Products Co.
Stephenson Chemical Co., Inc.

•

PRE-EMERGENT (Selective)

•

ALANAP

E-Z Flo Chemical Co.

AMIBEN*

Amchem Products, Inc.
E-Z Flo Chemical Co.

ATRAZINE*

See Soil Sterilants

BANDANE*

B. G. Pratt Co.
Prentiss Drug & Chemical Co., Inc.
Residex Corp.
Riverdale Chemical Co.
Southern Mill Creek Products Co.
Thompson-Hayward Chemical Co.
Velsicol Chemical Corp.

BANVEL—D*

Velsicol Chemical Corp.

BETASAN*

Stauffer Chemical Co.

CALCIUM PROPYL ARSONATE

Amchem Products, Inc.
W. A. Cleary Corp.
Lobel Chemical Corp.
Southern Mill Creek Products Co.
Vineland Chemical Sales Corp.

CHLORDANE

See Insecticides

CIPC

California Chemical Co., Ortho Div.
Chapman Chemical Co.
E-Z Flo Chemical Co.
Lobel Chemical Corp.
Neil A. Maclean Co., Inc.
Miller Chemical & Fertilizer Corp.
Pittsburgh Plate Glass, Chem. Div.
Riverdale Chemical Co.
Southern Mill Creek Products Co.
Thompson-Hayward Chemical Co.

DACTHAL*

Chapman Chemical Co.
Diamond Alkali Co.
E-Z Flo Chemical Co.
Heritage House Products, Inc.
Hub States Chemical & Equipment Co.
Neil A. Maclean Co., Inc.
Miller Chemical & Fertilizer Corp.
Riverdale Chemical Co.
Smith Douglass Co., Inc.
Southern Mill Creek Products Co.

EPTAM*

Chapman Chemical Co.
Stauffer Chemical Co.

HERBAN*

Hercules Powder Co.

PCP

California Chemical Co., Ortho Div.
Chapman Chemical Co.
Dow Chemical Co.
E-Z Flo Chemical Co.
Miller Chemical & Fertilizer Corp.
Pennsalt Chemicals Corp.

SESONE*

Amchem Products, Inc.
E-Z Flo Chemical Co.
Miller Chemical & Fertilizer Corp.
Union Carbide Corp., Chemicals Div.

SIMAZINE*

See Soil Sterilants

TILLAM*

Stauffer Chemical Co.

TRICALCIUM ARSENATE

Chipman Chemical Co., Inc.
E-Z Flo Chemical Co.
General Chemical Div., ACC
Lobel Chemical Corp.
Pennsalt Chemicals Corp.
Vineland Chemical Sales Corp.

VEGADEX*

E-Z Flo Chemical Co.
Monsanto Chemical Co.
Smith Douglass Co., Inc.

ZYTRON*

Dow Chemical Co.
E-Z Flo Chemical Co.
Hub States Chemical & Equipment Co.
Riverdale Chemical Co.
Southern Mill Creek Products Co.
Thompson-Hayward Chemical Co.

•

POST-EMERGENT (Selective & Non-Selective)

•

AMITROLE

See Soil Sterilants

AMMONIUM METHYL ARSONATE

Ansul Chemical Co.
Black Leaf Products Co.
W. A. Cleary Corp.
Doggett Fison Co.
Lobel Chemical Corp.
B. G. Pratt Co.
Southern Mill Creek Products Co.
Stephenson Chemical Co., Inc.
Vineland Chemical Sales Corp.

AMMONIUM SULFAMATE

See Soil Sterilants

ARSENIC ACID

California Chemical Co., Ortho Div.
Chapman Chemical Co.
Chipman Chemical Co., Inc.
General Chemical Div., ACC
Miller Chemical & Fertilizer Corp.
Niagara Chemical Div., FMC
Pennsalt Chemicals Corp.
Stauffer Chemical Co.

ATRAZINE*

See Soil Sterilants

BORATE COMPOUNDS

See Soil Sterilants

CACODYLIC ACID

Ansul Chemical Co.

CALCIUM ACID METHYL ARSONATE

Doggett Fison Co.
Lobel Chemical Co.
Southern Mill Creek Products Co.
Vineland Chemical Sales Corp.

CALCIUM PROPYL ARSONATE

See Pre-Emergent Herbicides

DACAMINE*

Diamond Alkali Co.
E-Z Flo Chemical Co.
Heritage House Products, Inc.
Nalco Chemical Co.
Smith Douglass Co., Inc.
Southern Mill Creek Products Co.

DALAPON

See Soil Sterilants

DIURON

See Soil Sterilants

DMA

Ansul Chemical Co.
Chapman Chemical Co.
Chipman Chemical Co., Inc.
W. A. Cleary Corp.
E-Z Flo Chemical Co.
Lobel Chemical Corp.