By PAUL E. PEDERSEN

In the past several years, weed specialists have been responsible for marked changes in long-established techniques of controlling weeds and undesirable grasses in industrial areas. Bermudagrass, bindweed, and crabgrass no longer need be common headaches for grounds maintenance crews and contract applicators. Even that hardy perennial, johnsongrass, which weed experts say is about the toughest of all, can be controlled with chemical weed killers.

Chemicals are becoming the widely recognized and accepted method of solving weed problems around industrial plants, buildings, petroleum tank farms, railway yards, outdoor storage areas, fence lines, along sidings, rights-of-way, above-ground pipe lines, in and around transformers, gasmetering substations, and in fire lanes and ditches. Here, unwanted vegetation can create an industrial safety hazard and contribute to fire or rust and corrosion of machinery, in addition to providing cover for insects and rodents. Quick-seeding weeds may infest not only the industrial property itself, but also neighboring properties.

Pramitol (commonly known as prometone) is Geigy Chemical Corporation's answer to the demand for industrial herbicides equal to these tasks. This non-selective herbicide (2-methoxy-4, 6-bis(isopropylamino)-s-triazine) is available in two formulations: Pramitol 25E liquid for spray application, and Pramitol 5P pellets for dry application.

Studies conducted with several industrial weed killers at Texas A&M University's College of Agriculture, under the direction of Professor Homer E. Rae, show that Pramitol is effective for preemergence control of weed seedlings and for postemergence control of annual and perennial weeds. These findings are summarized in Table 1.

Works on Contact and in Soil

Both formulations of Pramitol kill most annual and perennial broadleaf weeds and grasses by disrupting vital plant processes. The herbicide destroys weeds through foliar contact, even where considerable top growth has already occurred. And, once moisture has moved it into the soil, it is picked up by roots of germinating weeds, where it continues to act, usually controlling vegetation for the full growing season or longer.

Pramitol spray can be applied before weeds emerge, or until they are about two to three
controls such annuals as downy
bromegrass, puncturevine, gold-
bromegrass, oatgrass, and goose-
to IV2 gals, per acre, the spray
months old. At rates of 5 gals,
to 7 1/2 gals. per acre, the spray
controls such annuals as downy
bromeaegrass, oatgrass, and goose-
grases, and such perennials as
quackgrass, puncturevine, golden
enrod, burdock, and plantain. To
control hard-to-kill perennials
like johnsongrass, bermudagrass,
field bindweed, and wild carrot,
rates of 20 gals. to 30 gals. per
acre are recommended.
It is noncorrosive to metal sur-
faces, and can be removed from
conventional spray equipment by
flushing with water immediately
after use. Caution should be
exercised when applying near
crop or ornamental areas, since
the herbicide is nonselective.

Apply Pellets Any Time
Because sodium chlorate and
sodium metaborate are added to
pelleted Pramitol, it can be ap-
plied either before, or any time
after, weeds emerge. Adequate
rainfall is required to move the
chemical into the root zone. It
can be spread with mechanical
applicators, such as push-type or
cyclone spreaders, or it can be
applied by hand. No mixing or
water is necessary, nor is applica-
tion timing critical.
Application of 1/2 lb. to 1 lb. of
Pramitol 5P per 100 sq. ft. of soil
surface is suggested to control
annual broadleaf weeds and
grasses. For the tougher peren-
nial weeds, use 1 lb. to 2 lb. for
the same area. In regions of high
rainfall or longer than usual
growing season, or when ex-
tended residual control is de-
sired, the higher application rate
is recommended.

Herbicide Combinations
Development of an effective
weed control program depends
on such factors as vegetation and
soil type and amount of rainfall.
For some of the more difficult
weed problems, herbicide com-
binations are often preferable for
faster top kill and longer residual
control.
A Pramitol-TCA combination
provides these advantages, and
can be useful when bermuda-
grass and johnsongrass are par-
ticularly difficult problems. On
sandy or light-textured soils,
infested areas can be sprayed
with a mixture of 10 gals. of
Pramitol 25E with 100 lbs. of
TCA and 400 gals. or more water
per acre. Increasing the amount
of Pramitol to 20 gals., with the
same rate of TCA and water, is
suggested where soils are heavy
or high in organic content.
Pramitol and oil combinations
can increase the speed and ef-
ciciency of top kill. The herbicide
goes into solution in most oils,
so no agitation is required during
application. Recommended rate
is 10 gals. to 20 gals. of herbicide
and 100 gals. to 200 gals. of oil per
acre.
Lower rates can be used when
weeds and grasses are small. To
control bermudagrass, for exam-
ples, the lowest rate is usually
adequate. As the height and
density of vegetation increases,
the combination rate can be in-
creased correspondingly. To thor-
oughly cover dense stands of
rough weeds such as johnson-
grass, the highest rate is re-
quired.
For more spray per acre, water
and a suitable emulsifier can be
added to the solution to reach
the desired volume of spray mix-
ture. Penetration and effective-
ness are increased accordingly.
Pramitol-oil-water emulsions at
400 gals. or more per acre are not
unusual where extremely dense
weed growth is to be harnessed.

Pramitol and Chlorates
This combination provides
good top kill, followed by long-
term residual control. It is usu-
ally applied as 5 gals. to 10 gals.
of liquid herbicide with 125 lbs.
to 150 lbs. of chlorate plus sodium
metaborate and 200 gals. to 400
gals. of water per acre. Because
the chlorates are high in solubil-
ity, they move rapidly into the
root zone to work on deep-rooted
established weeds. For the most
part, herbicide remains near the
soil surface to kill young weeds
shortly after germination. Lower
rates will generally control most
annual weeds; higher rates are
necessary where persistent
weeds remain. For these
weeds, a combination of 5 lbs.
chlorate per 100 gals. of water
and 1 lb. of Pramitol is usually
effective.

Table 1. Tests Conducted at Texas A&M University on the Effectiveness of Pramitol 25E

<table>
<thead>
<tr>
<th>Active Ingredient per Acre</th>
<th>Spray Volume per Acre</th>
<th>Time and Application</th>
<th>Weeds Controlled</th>
<th>Remarks</th>
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</thead>
<tbody>
<tr>
<td>10 to 16 lbs. in water.</td>
<td>200 to 300 gals. with power gun</td>
<td>Sept. 15 to April 15, to short weeds and soil</td>
<td>Delayed control of most emerged annuals, and some shallow-rooted perennials. Preemergence control of most seedlings after one or more 2-in. rains.</td>
<td>Residual control of 18 to 30 months, except for emerged oxalis and dallisgrass. and their seedlings, and most deep-rooted perennials.</td>
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<tr>
<td>10 to 16 lbs. in toxic oil</td>
<td>150 to 200 gals. with power gun</td>
<td>Anytime, but preferably when temp. is above 80°. Apply overall and to soils.</td>
<td>Foliage kill of all species. Top kill of most herbaceous species. Preemergence control of seedlings of most species after rainfall of 2 in.</td>
<td>Residual control of 18 to 30 months, except for invasion by oxalis and some emergence of dallisgrass.</td>
</tr>
<tr>
<td>30 to 40 lbs. in toxic oil</td>
<td>150 to 200 gals. with power gun</td>
<td>Anytime, to all vegetation and soils.</td>
<td>Foliage kill of all species. Top kill of most herbaceous species. Delayed eradication of johnsongrass and bermudagrass after several 2-in. rains.</td>
<td>Residual control of 18 to 30 months, with exceptions of emerged oxalis and dallisgrass, and seedlings of these species.</td>
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</table>
recommended where tough perennials predominate.

Combinations of Pramitol and hormone-type weed killers are practical where hard-to-kill broadleaf weeds are present with woody vegetation. These combinations work best when applied early in the growing season.

To control woody plants 2,4,5-T or silvex are recommended additives to Pramitol. Application rates will vary from one location to another, ranging from 5 gals. to 10 gals. of Pramitol combined with 2 lbs. to 4 lbs. acid equivalent of 2,4-D, 2,4,5-T, or silvex. Whichever combination is selected, it should be mixed with sufficient water to assure good coverage of foliage.

Addition of 2 lbs. to 4 lbs. of a hormone-type weed killer to a Pramitol-chlorate or Pramitol-oil combination will broaden the spectrum of weeds that can be controlled and hasten top kill.