



GOLF COURSE SUPERINTENDENTS depend on Bensumec 4 LF because it's the one pre-emerge they can absolutely trust to control *Poa annua*, goosegrass and crabgrass in their bentgrass greens and tees, as well as for use on established bluegrass, Bermuda, zoysia — in fact, all turf species.



LAWN AND LANDSCAPE MANAGERS depend on Bensumec 4 LF because it's the one pre-emerge with *no-problem* spray-tank compatibility. Spontaneous emulsification assures easy mixing with Trimec® Broadleaf Herbicide, Ferromec® AC Liquid Iron, Embark® Plant Growth Regulator, high-nitrogen fertilizers, and insecticides.

# How to outwit the ominous threat of crabgrass in '89:

Last year's severe drought and heat have seeded this year's turf with major problems that are going to germinate throughout spring, early summer and fall. Read how to protect yourself.

**B**ensumec™ 4 LF Herbicide is the answer. It's the premier pre-emerge to control *Poa annua*, crabgrass, goosegrass, henbit, lambsquarters, redroot pigweed and shepherdspurse — the problem weeds that are scheduled to appear en masse this year.

And what is so special about Bensumec 4 LF?

The active ingredient and the formulation!

Bensumec 4 LF is PBI/Gordon's unique formulation of the one-and-only Betasan®, which has been the overwhelming choice of prestigious country clubs for more than 20 years.

The "LF" formulation greatly improves spray-tank compatibility with Trimec® Herbicide, Embark®

Plant Growth Regulator, liquid fertilizers and insecticides.

Spontaneous emulsification assures easy mixing with water to provide a uniform mixture of Bensumec 4 LF, and thus eliminates problems of spray-tank layering — even in those systems with limited agitation.

And all of this is accomplished without losing any wettability or soil penetration that is so vital to the success of controlling grassy weeds.

Apply Bensumec 4 LF from September through early spring for spring control, and in late spring through June for summer control.



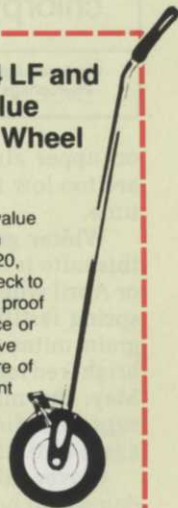
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THE TRIMEC® PEOPLE**

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To receive via UPS your \$60 value Roll-X Measuring Wheel with collapsible handle for only \$20, send this coupon with your check to PBI/Gordon Corporation with proof of purchase (a copy of invoice or sales ticket) showing you have purchased one gallon or more of Bensumec 4 LF Pre-emergent Grass & Weed Herbicide between February 1, 1989 and Oct. 30, 1989, when offer ends. Limit one coupon per customer.



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Kansas City, MO 64101  
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(In MO 1-800-892-7281)

# BENSUMEC™ 4 LF

PBI/GORDON'S UNIQUE FORMULATION OF BETASAN HERBICIDE

## SUMMARY OF GRUB CONTROL TESTS IN OHIO - 1971-81<sup>1</sup>

| INSECTICIDE            | LB AI/A | MEAN % CONTROL | (NO. OF TESTS) <sup>2</sup> |
|------------------------|---------|----------------|-----------------------------|
| ethoprop (Mocap)       | 5.0     | 83             | (10)                        |
| isazofos (Triumph)     | 2.0     | 92             | (20)                        |
| bendiocarb (Turcam)    | 2.0     | 83             | (18)                        |
| isofenphos (Oftanol)   | 2.0     | 80             | (37)                        |
| carbaryl (Sevin)       | 8.0     | 64             | (14)                        |
| trichlorfon (Proxol)   | 8.0     | 81             | (23)                        |
| diazinon               | 5.5     | 60             | (16)                        |
| chlorpyrifos (Dursban) | 4.0     | 43             | (11)                        |

<sup>1</sup> Includes Japanese beetle, *Cyclocephala* spp., *Phyllophaga* spp. only. <sup>2</sup> Each test replicated 3 or 4x. Generally, treatments applied late summer or early spring. Irrigated (1/4-1/2 inch) after application, thatch - 1/2 inch, readings taken ca. 4-8 weeks after treatment.-H.D. Niemczyk & K.T. Power.

on upper air winds. Aphid numbers are too low to detect in lawns at this time.

**Winter grain mite**—Damage from this mite is often first noted in March or April when turf areas are receiving spring fertilizer applications. Winter grain mites are identifiable by eight bright red legs and a dark body. By late May, the mites will have laid their eggs and died. Mites do not appear again until the eggs hatch in October.

**Clover mites**—Incidents of visible damage to home lawns are often seen in April in several Ohio cities and Denver. Usually a nuisance pest in and around homes, the clover mite occurs in large numbers (5,000 per square foot) across entire lawns and on turf next to building foundations. Symptoms of injury were the same as the winter grain mite. Turf next to foundations may be killed.

The clover mite has a slightly pink body and eight pale-colored legs. The first pair of legs is extremely long and protrude well out in front of the mite. The absence of bright red legs distinguishes the clover mite from the winter grain mite.

### Summer (June-August)

**Chinch bugs**—Chinch bug eggs continue to hatch into June. Bright red nymphs with a center white band appear. The number of chinch bugs in-

creases rapidly in June. Their populations peak in July and August, when northern lawns can receive severe damage. This damage is often masked by summer dormancy of turf caused by drought. Hot, dry conditions are ideal for chinch bugs.

During August the nymphs molt into adults that mate and lay eggs, thus producing a second generation. Some northern areas have only one generation per year.

**Billbugs**—Bluegrass billbug larvae feed in grass stems during June and move to the plant crowns, roots and rhizomes during July. This feeding pattern causes brown spots that frequently resemble the symptoms of some fungus diseases. Symptoms are also often masked when the turf is dormant from drought.

The larvae usually move deeper into the soil under dry soil conditions. During late July and August the larvae burrow deeper into the soil to pupate and transform into adults.

**Grubs**—By June, grubs have stopped feeding and are in the pupal stage, three to four inches in the soil. Beginning in mid-June and continuing through mid-July, the adults of various species emerge and burrow into the soil to lay eggs. Hatching and appearance of young larvae occur during July and August.

Extreme heat and drought during

the summer may cause some grubs to move deeper in the soil. Under such conditions, irrigation several hours before treatment and a thorough soaking afterward is advisable.

**Black turfgrass ataenius**—Eggs laid by beetles during May hatch in June and the larvae immediately begin feeding on turf roots and thatch.

From late June to mid-July, symptoms of injury include wilting in spite of irrigation. In July, larvae move deep into the soil, pupate and emerge as adults. These adults lay eggs during August, producing a second generation in some states. The second generation larvae are capable of damaging turf. States farther north have only one generation.

**Sod webworms**—Damage from sod webworm larvae occurs occasionally in most of the cool-season turf region. Injury is more common in mid-western states, usually in July and August. Older sod fields or areas with heavy thatch are good candidates for infestation. There are generally one or two generations per year, depending on the species.

**Cutworms**—Cutworm larvae continue to cause damage to golf course greens from June through August. These larvae pupate in the soil or thatch and emerge as moths that lay eggs for additional generations.

**Fall armyworm**—The fall ar-

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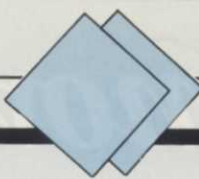
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# INSECT

# CONTROL



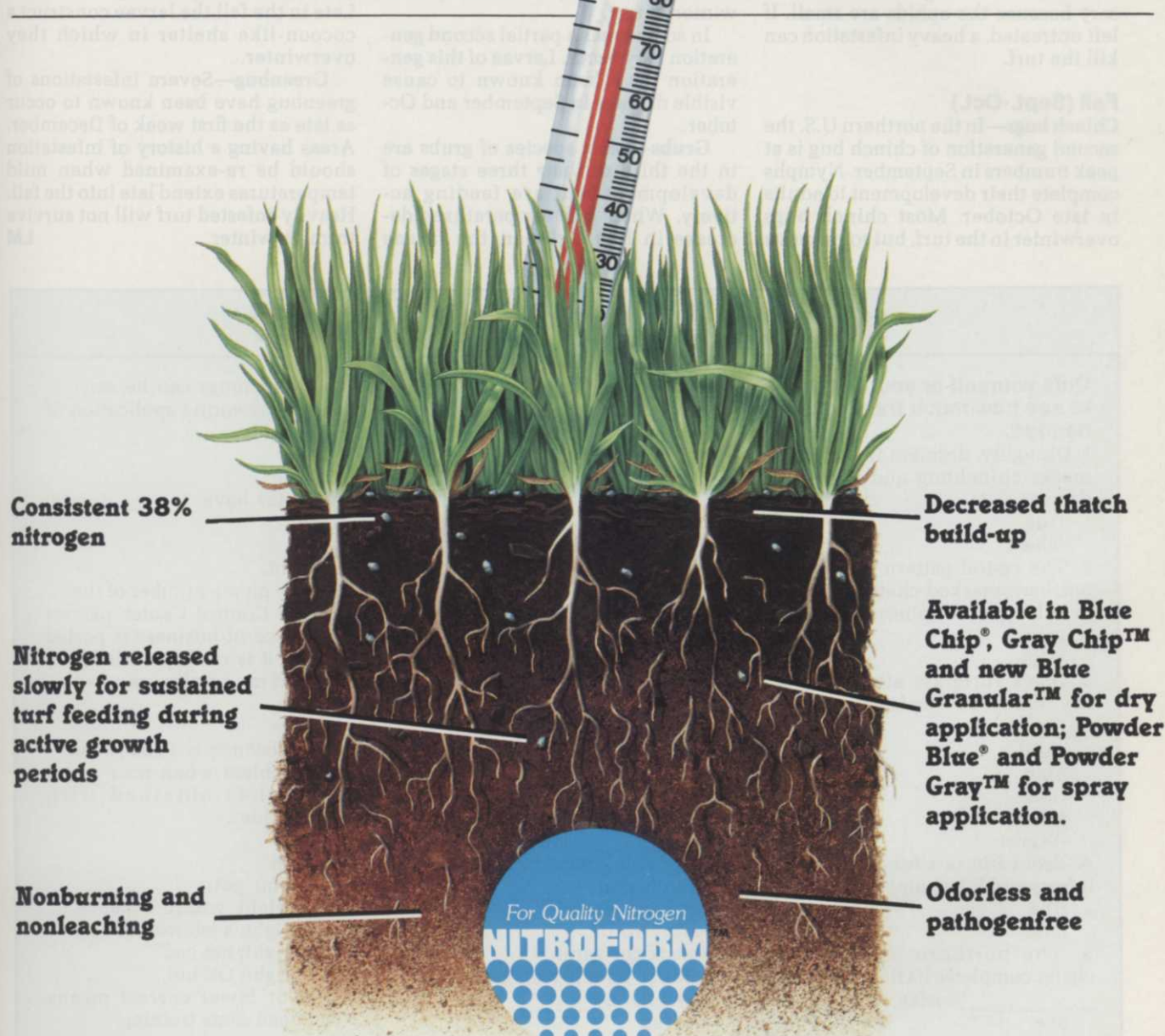
| COOL SEASON*                        | LATE WINTER   | SPRING (April-May)  | SUMMER (June-Aug.)  | FALL (Sept.-Oct.)   |
|-------------------------------------|---|---|---|---|
| <b>CHINCH BUGS</b>                  | When summer damage is expected preventative application of liquid or granular Dursban (1 lb. Ai/acre) or Oftanol (2 lbs. Ai/acre) may be used as soon as the insects become active. | Preventative applications of insecticides should be completed by the first week in May.   | Treat before injury is severe with Dursban (1 lb. Ai/acre), diazinon** (2.5-5.5 lbs. Ai/acre), or other labeled insecticides.   | Treat if necessary, but generally infestation levels are not high enough to warrant using insecticides.           |
| <b>BILLBUGS</b>                     | Same as for chinch bugs.  | Same as for chinch bugs   | Treat infestations at same rates as grubs with Triumph <sup>1</sup> diazinon**, Turcam, Proxol or Sevin. Irrigate following application.  | Treatment is usually not appropriate at this time.  |
| <b>GRUBS</b>                        | Application of Oftanol (2 lbs. Ai/acre) during March may provide control of overwintered grubs. This may not provide control into late summer.                                      | A single application of Oftanol (2 lb. Ai/acre) made in April may control overwintered grubs. Can also be controlled in May by spot or general treatment with Triumph <sup>1</sup> (2 lb. Ai/acre) Turcam (4 lb. Ai/acre) or Sevin (8 lb. Ai/acre). Golf course superintendents can use Mocap (5 lb. Ai/acre) or Sevin (6-8 lb. Ai/acre) to control green June beetle. Irrigate with application. | Existing infestations found in July or Aug. may be treated with Triumph <sup>1</sup> , Proxol, Turcam, Oftanol, Sevin or Mocap (commercial turf only) at rates used in spring. Treat green June beetle with Sevin (6-8 lbs. Ai/acre). | Treatment can be made as late as Mid-September. Irrigate first if thatch or soil is dry.                          |
| <b>SOD WEBWORMS</b>                 | Treatment is not appropriate at this time.  | When necessary, apply diazinon** (5 lb. Ai/acre) Triumph <sup>1</sup> (1 lb. Ai/acre) Dylox or Proxol (6-8 lb. Ai/acre). Orthene (1-3 lb Ai/acre).  | Make application when larvae are present or two weeks after peak moth flight. Use Dursban (1 lb. Ai/acre), Triumph <sup>1</sup> (1 lb. Ai/acre), Diazinon** (5 lbs. Ai/acre), Sevin (6-8 lbs. Ai/acre) or Proxol (6-8 lbs. Ai/acre).  | Larvae are small and cause little damage at this time. Treatment in September reduces population for next spring. |
| <b>GREENBUGS</b>                    | Treatment is not appropriate at this time.  | Aphid numbers are too low to detect.  | Use Orthene (1 lb. Ai/acre) or Dursban (1 lb. Ai/acre) or diazinon** (2.5 lbs. Ai/acre).  | Severe infestations may occur as late as December. Use the same insecticides as in the summer.                    |
| <b>BLACK TURFGRASS<br/>ATAENIUS</b> | An application of Oftanol (2 lb. Ai/acre) in March may prevent summer infestations of larvae, but it's best to wait until April.  | Application of Oftanol (2 lbs. Ai/acre) during April or May can prevent larval infestations during summer. Dursban (1-2 lbs. Ai/acre) applied to fairways in April also prevents infestations. Retreatment after 2 weeks may be necessary.  | If preventative applications were not made, spot or generally treat with Triumph <sup>1</sup> (2 lbs. Ai/acre), Proxol (8 lbs. Ai/acre), Turcam (2-4 lbs. Ai/acre), Sevin (8 lbs. Ai/acre) or Mocap (5 lbs. Ai/acre), as needed.      | Undeveloped larvae die with frost.  |
| <b>CUTWORMS</b>                     | Treatment is not appropriate at this time.  | The insecticides effective against sod webworm are also effective against cutworms. Apply late in the afternoon. Do not irrigate following liquid applications unless specified on label.   | Use Orthene (1-3 lb. Ai/acre), Dursban (1 lb. Ai/acre), Triumph <sup>1</sup> (1 lb. Ai/acre), Proxol (8 lbs. Ai/acre) or Sevin (6-8 lbs. Ai/acre). Do not irrigate following liquid applications unless specified on label.           | Same as for summer.   |
| <b>CLOVER MITES</b>                 | Treatment is not appropriate at this time.  | Liquid diazinon** (2.5 lbs. Ai/acre) or Dursban (1 lb. Ai/acre) may be used.  | Treatment usually is not necessary.   | Treat as needed with liquid diazinon** (2.5 lbs. Ai/acre) or Dursban (1 lb. Ai/acre).                             |
| <b>WINTER GRAIN MITE</b>            | If needed, use spring treatment.  | If treatment is necessary, use liquid diazinon** (2-3 lbs. Ai/acre) or Dursban (1 lb. Ai/acre). Avoid repeated use of Sevin.  | Treatment is not appropriate, since mite is in egg stage.   | Treatment is not appropriate since mite is in egg stage.  |

<sup>1</sup> For use only by commercial lawn pest control personnel except in states where Special Local Needs labeling permits use on golf course tees, greens and aprons, and on sod farms. A maximum of one application per year is permitted for the 2 lbs. Ai/acre rate. A maximum of two applications per year at least 60 days apart is permitted for the 1 lb. Ai/acre rate.

\* See accompanying text for details; always follow label directions.

\*\* Diazinon may not be used on golf courses or sod farms.

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**INSECTS** from page 54

myworm is seldom a problem of cool-season turf.

**Greenbug**—Damaging populations of greenbugs can occur from June through August. Populations and incidents of damage frequently vary from area to area, even within the same city.

Symptoms of injury include turf under the dripline of trees and in open areas having a burnt orange color. When symptoms are apparent, numerous aphids (40 or more) may be seen on a single grass blade. Close examination of damaged turf is necessary because the aphids are small. If left untreated, a heavy infestation can kill the turf.

**Fall (Sept.-Oct.)**

**Chinch bugs**—In the northern U.S. the second generation of chinch bug is at peak numbers in September. Nymphs complete their development to adults in late October. Most chinch bugs overwinter in the turf, but some move

to protected areas before winter.

Generally, infestation levels at this time are not high enough to warrant the use of insecticides. Early fall rains and infection by a parasitic fungus (*Beauveria* spp.) usually provide sufficient control.

**Billbugs**—During September, billbug adults that developed from summer larvae are often seen on sidewalks, driveways, or other paved surfaces. Before winter, these adults seek shelter in thatch, along sidewalk edges or near foundations and overwinter there. Many, if not most, overwinter in turf.

In some areas a partial second generation may occur. Larvae of this generation have been known to cause visible damage in September and October.

**Grubs**—Most species of grubs are in the third of their three stages of development and are feeding actively. When soil temperatures decrease in late October, the larvae

burrow deeper into the soil to overwinter. If soil temperatures remain warm, larvae stay at the surface and continue feeding. Severely cold winters have little effect on survival.

**Black turfgrass ataenius**—By September, adults of the current generation begin to fly into protected areas, such as golf course roughs, to overwinter. Larvae that have not completed development to adults before the first frost are killed.

**Sod webworm**—Northern sod webworm larvae are small and cause little if any damage in the fall. Late in the fall the larvae construct a cocoon-like shelter in which they overwinter.

**Greenbug**—Severe infestations of greenbug have been known to occur as late as the first week of December. Areas having a history of infestation should be re-examined when mild temperatures extend late into the fall. Heavily-infested turf will not survive through winter. **LM**

**INSECT EXPERT OR NOVICE?**

**Quiz yourself or your crew to see how much training is needed.**

- 1. Droughty, dormant turf often masks chinchbug and billbug damage.  
true  
false
- 2. The rastral pattern of the northern masked chafer is two parallel rows of spines.  
true  
false
- 3. Black turfgrass ataenius lay most of their eggs in \_\_\_\_\_.  
April  
May  
June  
July  
August
- 4. *Beauveria* is a fungus that infects and kills chinchbugs.  
true  
false
- 5. The northern masked chafer completes its life cycle in \_\_\_\_\_ year(s).  
one  
two  
three

- 6. Chinchbugs have \_\_\_\_\_ mouthparts.  
chewing  
piercing-sucking  
rasping
- 7. Grubs consume \_\_\_\_\_.  
turf roots only  
thatch  
soil  
soil, turf roots and thatch
- 8. Bluegrass billbug adults lay eggs in \_\_\_\_\_.  
soil  
thatch  
grass crowns  
grass stems
- 9. Greenbugs feed on tree leaves.  
true  
false
- 10. \_\_\_\_\_ is a common pest of golf greens in the cool-season region.  
sod webworm  
armyworm  
black cutworm
- 11. Most species of grubs overwinter as \_\_\_\_\_.  
larvae  
pupae  
adults  
eggs

- 12. Chinchbugs can be controlled by spring application of insecticide.  
true  
false
- 13. Mites have \_\_\_\_\_ legs.  
four  
six  
eight
- 14. The phone number of the Poison Control Center nearest my place of business is posted where it is readily available to me and my employees.  
true  
false
- 15. Resistance is usually not the problem when poor insect control is obtained with insecticide.  
true  
false  
If you got:  
15 right you're super  
14 right: a job well done  
13 right: not bad  
12 right: OK but...  
11 or fewer correct means you need some training!

- 1. True.
- 2. False.
- 3. May.
- 4. True.
- 5. One.
- 6. Piercing-sucking
- 7. Soil, turf roots and thatch.
- 8. Grass stems.
- 9. False.
- 10. Black cutworm.
- 11. Larvae.
- 12. True.
- 13. Eight.
- 14. True (I hope).
- 15. True.

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But once it touches your turf, new Pace delivers Pythium control never before





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seen in a single fungicide. Because a single fungicide it's not.

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So if you've been waiting for a fungicide that not only takes care of Pythium, but also things like employee exposure and container disposal, it's finally here.

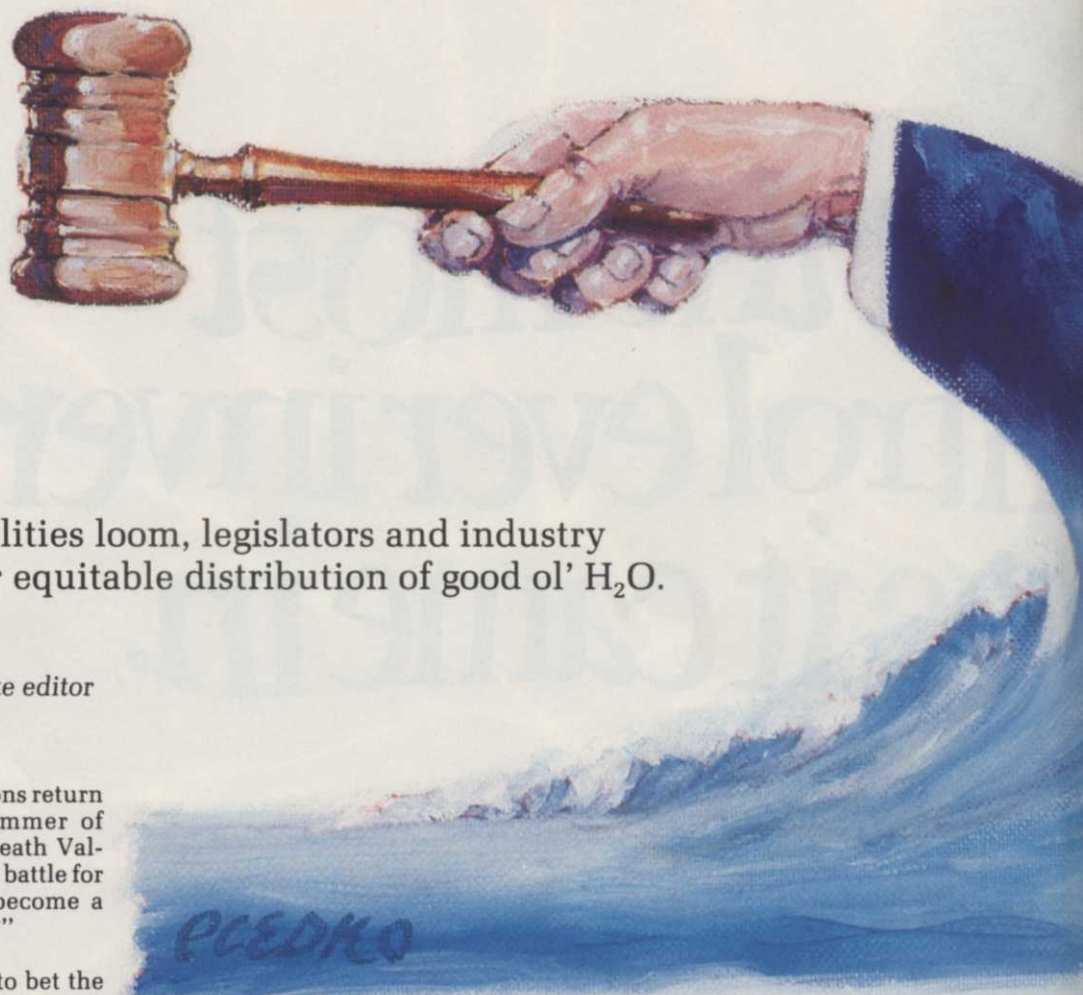
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# THE POLITICS OF WATER



As drought possibilities loom, legislators and industry associations vie for equitable distribution of good ol' H<sub>2</sub>O.

By Terry McIver, associate editor

**W**ill drought conditions return and make the summer of 1989 a rerun of "Death Valley Days?" And if so, will the battle for control of city reservoirs become a "Gunfight at the OK Corral?"

Maybe and maybe.

No expert is yet willing to bet the ranch that this summer's weather will match the drought conditions of 1988, which parched the Corn Belt, reducing soybean and grain production. But no one can deny that Mother Nature just hasn't been herself lately.

Warmer-than-usual temperatures prevailed this winter, with January temperatures reaching the 60s in many Midwestern cities. Played behind this scenario is the ongoing drama of water legislation and regulation. Every day of lower-than-normal rain or snowfall increases the possibility that communities everywhere will again be subject to strict rationing of local water supplies.

## Enter the green industry

As a major water user, the green industry plays a large role in water politics. Unfortunately, due to its high visibility, it's often miscast as a water-wasting heavy—the black-caped villain who uses water to no end. Clarifying that image has been the task of

industry associations in touch with local legislators. What are they finding? At the bottom of the legislative well is the bottled message: participation in local legislation and education is crucial to making laws more fair and favorable to the green industry.

Randy Tischer, president of Green Velvet Sod Farms of Bellbrook, Ohio, believes the summer of 1988 was an example of "what may happen unless we (the sod industry) become better informed and have an impact on those who make

the decisions."

Tischer says that by August of 1988, with drought horror stories being reported nationwide, "some well-intentioned but ill-informed decisions were made.

"When household water taps went dry in Illinois," says Tischer, "the agricultural irrigators were identified as the cause of the misery. When city planners and those issuing building permits in Indiana and New Jersey announced their new regulations concerning landscaping and the use of water, in many cases they simply eliminated the plan's irrigation system/turfgrass allotment."



**Fred L. McGee, Jr.,** executive director of the Florida Irrigation Society, fights the fly-by-nighters and promotes the use of efficient irrigation systems.

**Preparing for the worst**  
An ongoing situation in