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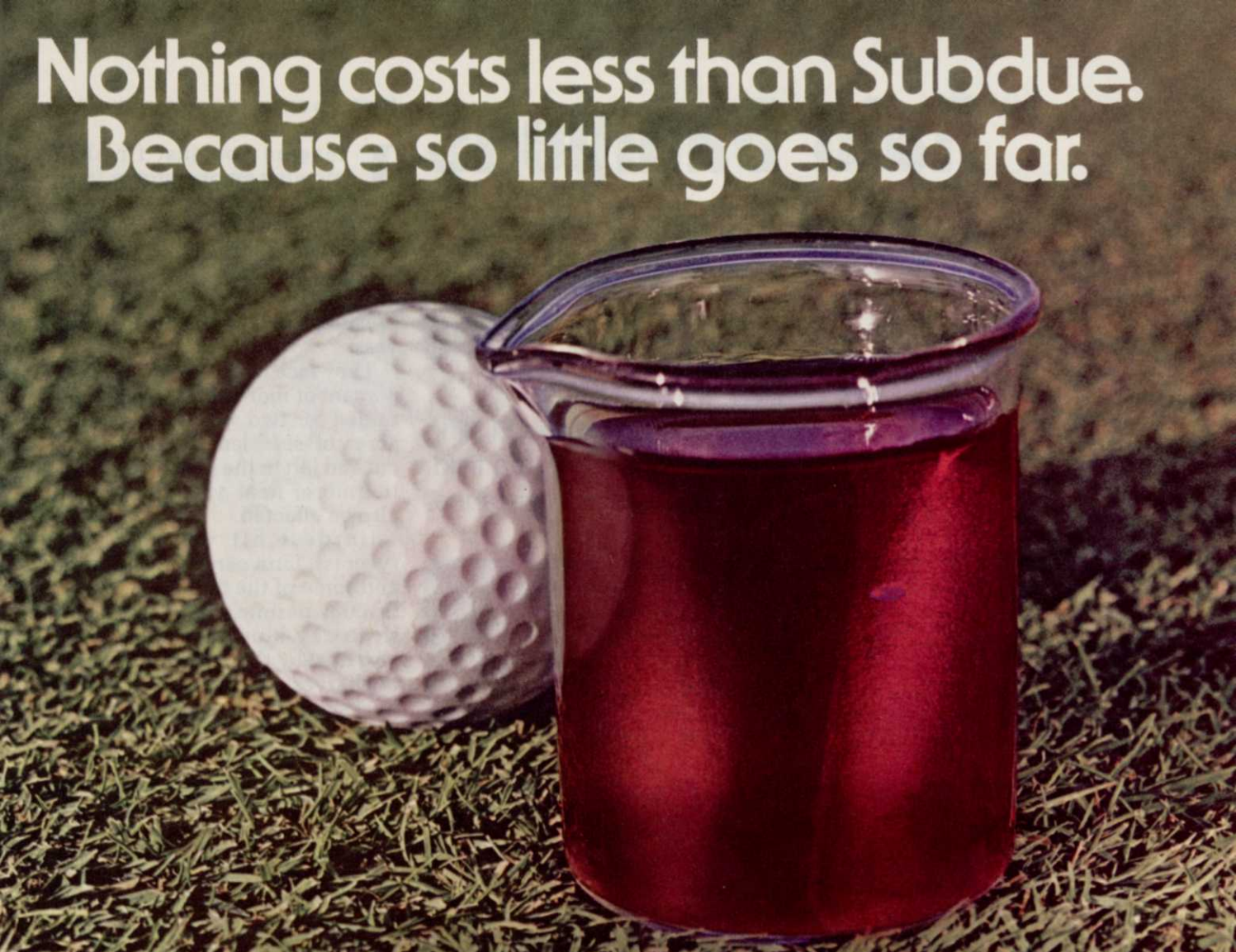

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Rain Dampens Seed Harvest:

Yields Are Off One Third

A strange weather pattern called El Nino hampers drying and harvesting of seed in the field. Growers ask for disaster assistance.

By Bruce Shank, executive editor

Imagine you just finished mowing an overgrown lawn when it starts pouring. It rains for two solid weeks. But, you still have to pick up the clippings.

Now you know how the growers of turf seed in Oregon, Washington, and Idaho feel this year.

They face crop reductions of 30 percent or more in 1983 because it rained for two weeks after many acres of seed-ladden grass were cut and left in the field to dry. Furthermore, next year's crop will also be affected.

Hardest hit were annual ryegrass, Linn perennial ryegrass, and some of the fine fescues. Tall fescue, perennial ryegrass and Kentucky bluegrass crops were also hurt by the wet weather during harvest. Bentgrasses were not hurt since they are later maturing grasses which had not yet been cut when the rain started falling.

All indications before the rain were that 1983 would be a bumper year. Some growers expected yields of 30-40 percent over 1982. Instead, they weighed their loads after combining to find 600 to 800 lbs. of seed per acre rather than 1,200 lbs. Much of the seed is darker in color from lying in the wet fields. Germination rates are down below 80 percent for some lots of annual ryegrass.

Field burning *has been complicated by regrowth and matted straw in the fields after harvest.*

Linn County Extension Agent *Hugh Hickerson shows magazine staff shattered and germinated seed beneath the windrows.*

Combines are jammed *by windrows which are entwined with green regrowth.*

Compact enough for tight spaces. Strong enough to go the distance.

When you buy a new John Deere 318 or 420 Lawn and Garden Tractor, you get maneuverability in a strong package that stands up to the daily abuse of big mowing jobs.

Strength begins with a beefy drive-train that delivers smooth, dependable power. Heavy-duty gasoline engines develop 18 and 20 hp in the 318 and 420, respectively. These reliable twin-cylinder engines feature an aluminum block with cast-iron cylinder liners plus full-pressure lubrication to keep them running cooler for longer life.

Hydrostatic drive makes it easy to match travel speed to the job. You control speed and direction with one lever; there's no clutching or gearshifting to slow you down.

Power steering permits even easier handling. It's standard on both tractors to speed mowing in cramped areas. And the 318 and 420 have a 26-inch turning radius. Individual rear-wheel brakes give you quick stops and let you make tight turns.

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Visit your John Deere dealer to take a closer look at these maneuverable tractors. Their strength will really show up. So will the dealer's expertise.

For the name of the nearest dealer, or free folder on the 318 and 420 Lawn and Garden Tractors, call 800-447-9126 toll free (Illinois, call 800-322-6796). Or write John Deere, Dept. 50, Moline, Illinois 61265.

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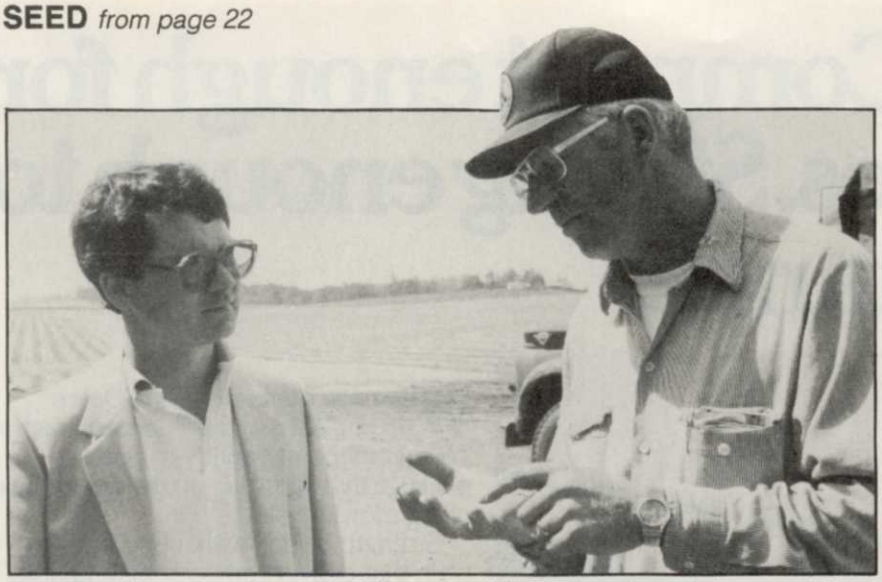


Dave Doerfler, *a member of the Silverton Hills Growers Association, explains the effects of the rain on his acreage and seed cleaning operation to Shank.*

"This has been the wettest July on record," said Dave Nelson, executive director of the Oregon Seed Council. "Some growers in the Willamette Valley and the Silverton Hills lost entire fields because of the rain. Bad burns are common which will affect next year's production."

"Some seed growers will go under this year," states Hugh Hickerson, Linn County extension agent. "Many of the younger farmers are heavily mortgaged to buy land and get started. One bad year can wipe them out."

Seed growers in Oregon are asking for disaster assistance since

Seed Supply Report

Listings are by cultivar name, company, and supply condition.
A represents supplies to be near surplus, B adequate, and C possible shortage.

Kentucky Bluegrass
Adelphi, Adikes, A
Admiral, International Seed, B
America, Pickseed, C
Aquila, Northrup King, C
Banff, Pickseed, C
Baron, Lofts, C
Bensun, Warrens, A
Birka, Burlingham, C
Columbia, Turf Seed, B
Eclipse, Garfield Williamson, B
Enmundi, International Seed, B
Enoble, International Seed, B
Fylking, Jacklin, B
Georgetown, Lofts, C
Haga, Burlingham, B
Merit, Full Circle, A/B
Midnight, Turf Seed, C
Mystic, Lofts, C
Nassau, Lofts, B/C
Nugget, Northup King, C
Parade, Northrup King, C
Park, Northrup King, B
Ram I, Lofts, C
Rugby, Northrup King, B
Scenic, International Seed, B
Shasta, Turf Seed, C
Sydsport, Burlingham, B
Touchdown, Pickseed, C
Vantage, International Seed, B

Perennial Ryegrass
Agree, Lofts, C
Allstar, Adikes, C
Barry, Lofts, B
Birdie, Turf Seed, C
Birdie II, Turf Seed, C
Blazer, Pickseed, B
Citation, Turf Seed, B
Cowboy, Lofts, C
Dasher, Pickseed, B
Delray, Northrup King, B
Derby, International Seed, B
Elka, International Seed, C
Eton, Northrup King, C
Fiesta, Pickseed, B
Gator, International Seed, B
Goalie, Northrup King, C
Manhattan, Turf Seed, C
Manhattan II, Turf Seed, B
NK 200, Northrup King, C
Omega, Turf Seed, B
Palmer, Lofts, B
Pennant, Burlingham, B
Pennfine, Northrup King, B
Prelude, Lofts, B
Repell, Lofts, C
Yorktown II, Lofts, B

Tall Fescue, Turf Type
Adventure, Warrens, C
Brookston, International Seed, B
Clemfine , Lofts, C
Falcon, Burlingham, C
Galway, Northrup King, C
Houndog, International Seed, B
Jaguar, Garfield Williamson, C
Mustang, Pickseed, C
Olympic, Turf Seed, C
Rebel, Lofts, C

Chewings Fescue
Adonis, International Seed, B
Agram, Pickseed, B
Atlanta, Northrup King, B
Checker, International Seed, B
Highlight, International Seed, B
Jamestown, Lofts, B
Shadow, Turf Seed, B
Wintergreen, Northrup King, A

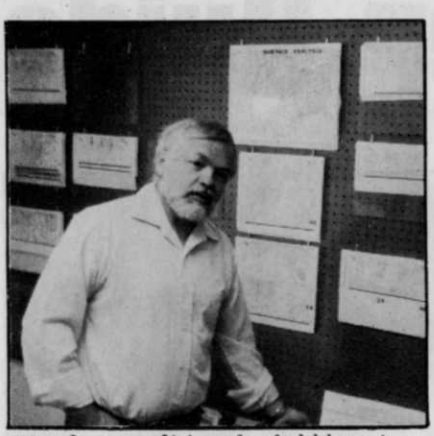
Creeping Red Fescue
Dawson, Northrup King, B
Ensylva, International Seed, B
Fortress, Turf Seed, C
Ruby, Northrup King, B

Hard Fescue
Aurora, Turf Seed, C
Reliant, Lofts, B
Scaldis, Northrup King, B
Spartan, Pickseed, C
Tournament, Pickseed, B
Waldina, Turf Seed, B

Bentgrass
Astoria, Northrup King, C
Bardot, Lofts, C
Emerald, International Seed, B
Highland Colonial, Northrup King, B
Penncross, Tee-2-Green, B
Penneagle, Tee-2-Green, B
Seaside, Northrup King, B

Other
Fults, Puccinellia distans, Northrup King, B
Sabre, Poa trivialis, International Seed, C

Overseeding Blends, Mixtures
CBS, Turf Seed, B
Dixie Green, International Seed, B
Futura Plus, Pickseed, B
Marvelgreen, Lofts, B
Medalist, Northrup King, B
Oregreen, Turf Seed, B
Ph.D., International Seed, B
Showboat, International Seed, B



Weather conditions*for field burning are provided twice a day by Oregon Seed Council Meteorologist "Irv" Tillung.*

losses are estimated above 30 percent, the requirement set by the government to qualify for low interest loans.

More than 300,000 acres in Oregon are used for production of turf seed, primarily ryegrasses and fescues.

Carryovers from last year of Kentucky bluegrass and perennial ryegrass may help growers meet demand this year, but turf type tall fescues and some fine fescues will be in short supply.

The rain causes a series of production problems. Once the seed crop is cut and placed in windrows to dry, the moisture content of the seed is too high to process. The grower has to wait for the moisture content to drop to 12 percent before combining to pick up the seed. Rain slows the drying of the seed in the field, causes combines to jam when the seed is finally harvested, and encourages seed which has shattered and fallen to the ground to germinate. The regrowth makes the windrows difficult for the combines to pick up.The newly germinated grass is undesirable since only the parent grass produces the right genetic combination.

After the fields are combined, they are burned to destroy unwanted straw, harmful fungi, second generation seed, and to encourage branching of the parent grass during regrowth. The additional branches help produce more seed the following year.

If the farmers don't get a satisfactory burn they can try to burn the fields a second or third time using propane torches at considerable expense. It appears likely that yields for next year will be down because of bad burns.

Doyle Jacklin of Jacklin Seed Co. in Post Falls, Idaho, estimates rain in his area has reduced Kentucky bluegrass yields by ten percent. He blames winter rains for causing fertility problems and another 20 percent loss in yields.

All seed companies report increasing demand for seed brought about by renewed construction and dramatically improved sales to sod growers. "Sod growers in many sections of the country sold out this spring and needed to replant quickly," said Jacklin. "Severe heat in the Midwest this summer should improve renovation business this fall." **WTT**

Fertilizer Guide

Part I:

Fertilizers and How They Work

By Roger Funk, Vice President, Research and Development, and Richard Rathjens, Agronomist, Davey Tree Expert Co., Kent, Ohio

Plants require at least 16 elements for proper growth and development. Three of the elements—carbon, hydrogen, and oxygen—are provided by air and water; the other essential elements are obtained from the soil.

The macronutrients; nitrogen, phosphorus, potassium, calcium, sulfur, and magnesium; are used in greater quantities than the other mineral elements absorbed from the soil.(see Table 1) Nitrogen, phosphorus, and potassium are often called the primary nutrients because of the amount used by the plants and their importance in supplemental fertilizers.

The micronutrients; iron, manganese, copper, zinc, boron, molybdenum and chlorine; are required in smaller quantities but are no less important. The so-called "acid-loving" plants have a relatively high requirement for certain micronutrients, and chlorosis caused by an iron deficiency is a common ailment when these plants are grown in alkaline soils (over pH 7.0). Because of reserves normally found in the soil, the addition of supplemental micronutrients is not often necessary unless the soil is excessively alkaline or sandy.

Table 1. The amount of Essential Elements Contained in Higher Plants*

Element	Percent of Plant Tissue**
Oxygen	45
Carbon	45
Hydrogen	6
Nitrogen	1.5
Potassium	1.0
Calcium	0.5
Phosphorus	0.2
Magnesium	0.2
Sulfur	0.1
Iron	0.01
Chlorine	0.01
Manganese	0.005
Zinc	0.002
Boron	0.002
Copper	0.0006
Molybdenum	0.00001

* Adapted from: B. R. Stout, 1961. Proceedings of 9th Annual California Fertilizer Conference, pp 21-23.

** These percentages vary from different species and for the same species grown under different conditions.

Fertilizers

Fertilizer is any material that supplements the soil's supply of elements required for plant growth and development. Fertilizers may be categorized as natural organic, synthetic organic, or inorganic based on their source and chemical structure.

Organic fertilizer consists of nutrient elements derived from compounds with a carbon structure. The term organic when applied to fertilizer should include only organic materials that are insoluble in water.

All living matter—plant or animal—is composed of compounds with a carbon structure. Proteins, fats, carbohydrates and other compounds synthesized by an organism have one common factor—a carbon structure. Any of these materials could be considered as organic fertilizers when placed in the soil. Common examples of **natural organic** fertilizers are animal manure, bonemeal, sewage sludge and plant refuse.

Scientists have synthesized compounds with a carbon structure which are also organic. Examples of **synthetic organic** fertilizers are ureaformaldehyde and isobutylidene diurea.

Inorganic fertilizers are nutrient elements derived from

sources which are not organic, those which have neither a carbon structure nor which have been derived from living matter. Examples of inorganic fertilizers are ammonium nitrate, ammonium phosphate, potassium nitrate and potassium chloride.

A complete fertilizer contains sources of nitrogen, phosphorus, and potassium. An incomplete fertilizer contains one or two of these elements in any combination, but never all three. Other fertilizer nutrients such as iron or magnesium may be present but are not considered in the definition of "complete" and "incomplete" fertilizers.

Analysis and Ratio

Fertilizer analysis or grade is the minimum guaranteed percentage by weight of nitrogen(N), phosphorus (expressed as P_2O_5 equivalent), and potassium (expressed as K_2O equivalent), and is printed on the container in that order.

For example, a 100 lbs. bag of 20-10-5 fertilizer is formulated from a nitrogen source(s) that contains 20 lbs. of elemental nitrogen, a phosphorus source(s) that contains the equivalent of 10 lbs. of P_2O_5, and a potassium source(s) that contains the equivalent of 5 lbs. of K_2O. Any of these elements missing from the formulation would be represented by a zero in the analysis. Ammonium nitrate, for example, which does not contain phosphorus or potassium, has an analysis of 33-0-0.

In addition to the total nitrogen, water insoluble nitrogen(WIN), if present, is also printed on the label as a percent of the total weight. For example, if half of the nitrogen of a 20-10-5 fertilizer is in a water insoluble form, the WIN content is 10%. Although WIN indicates the portion of nitrogen in a controlled-release fertilizer that is slowly soluble, it is not appropriate for coated fertilizers that encapsulate soluble nitrogen. In this case, the controlled-release nitrogen may be expressed in terms of dissolution rate. See Slow-Release Nitrogen for a more detailed description.

Fertilizer ratio is the relative amounts of nitrogen, phosphorus and potassium. A fertilizer with an analysis of 20-10-5 would contain four times as much nitrogen as potassium and twice as much phosphorus as potassium.The ratio then would be 4:2:1.

Table 2. The essential elements and the forms available to green plants.

Elements		Available forms
1. Macronutrients		
Nitrogen	(N)	NO_3-, NH_4+, Urea (some)
Phosphorus	(P)	HPO_4--, H_2PO_4-
Potassium	(K)	$K+$
Calcium	(Ca)	$Ca++$
Magnesium	(Mg)	$Mg++$
Sulfur	(S)	SO_4--, SO_3-
2. Micronutrients		
Iron	(Fe)	$Fe++$, $Fe+++$
Manganese	(Mn)	$Mn++$, $Mn+++$
Copper	(Cu)	$Cu+$, $Cu++$
Zinc	(Zn)	$Zn++$
Boron	(B)	BO_3---
Molybdenum	(Mo)	MoO_4--
Chlorine	(Cl)	$Cl-$

Absorption

All fertilizer nutrients, regardless of the source, are absorbed by plant roots as charged atoms or groups of atoms called ions—nutrient salts (see Table 2). These ions exhibit either a positive or a negative charge which is essential for root absorption by electrical attraction.

Inorganic fertilizers form ions readily when dissolved in water and therefore are quickly available for root absorption. Organic fertilizers—both natural and synthetic—must be hydrolyzed(decomposed) by soil microorganisms from complex compounds to the same nutrient salts provided by inorganic fertilizers. The rate of decomposition is dependent upon soil factors such as temperature, moisture and pH.

Burn

Fertilizer burn is the visible symptom of insufficient water in a plant associated with an overapplication of fertilizer salts.

The movement of water across the root cell membrane is regulated by the concentration of dissolved fertilizer salts in soil solution relative to the dissolved salts within the cell. As fertilizer salts dissolve in water, they raise the osmotic pressure of the solution. Water always moves from the side of the membrane with the low osmotic pressure to the side with higher osmotic pressure. Root cells actively absorb fertilizer salts from soil solution, and under normal conditions, maintain a higher osmotic pressure.

If excess fertilizer salts are applied and raise the osmotic pressure of soil solution, water cannot enter the cell and may actively move out of it. The resulting injury is known as fertilizer burn or physiological drought.

Salt index values are a measure of a fertilizer's relative tendency to increase the osmotic pressure of the soil solution. Sodium nitrate has been given a salt index value of 100 and the value for all other fertilizers is relative to an equal weight of sodium nitrate. The higher the salt index, the greater the potential for a fertilizer to raise the osmotic pressure of soil solution and, thus, cause burn. See Table 3 for salt indexes.

Because some nutrient sources are more concentrated than others(have higher percentages of N,P,or K) the actual increase in burn potential is affected by the application rate as well as the salt index. The partial salt index is calculated per unit of each nutrient and compares the rela-

Fertilizer

Table 3. Salt indexes of common fertilizer sources*

Fertilizer	Formula	% N	% P_2O_5	% K_2O	Salt Index	Partial** Salt Index
Nitrogen sources						
Ammonium nitrate	NH_4NO_3	35.0	—	—	104.7	2.99
Ammonium sulfate	$(NH_4)_2SO_4$	21.2	—	—	69.0	3.25
Sodium nitrate	$NaNO_3$	16.5	—	—	100.0	6.06
Potassium nitrate	KNO_3	13.8	—	—	73.6	5.34
Urea	H_2NCONH_2	46.6	—	—	75.4	1.62
Natural organic		5.0	—	—	3.5	0.70
Monoammonium phosphate	$NH_4H_2PO_4$	12.2	—	—	29.9	2.45
Diammonium phosphate	$(NH_4)_2HPO_4$	21.2	—	—	34.2	1.61
Phosphorus Sources						
Superphosphate	$Ca(H_2PO)_2+CaSO_4$	—	20.0	—	7.8	0.39
Triple superphosphate	$Ca(H_2PO_4)_2$	—	48.0	—	10.0	0.21
Monoammonium phosphate	$NH_4H_2PO_4$	—	61.7	—	29.9	0.49
Diammonium phosphate	$(NH_4)_2HOP_4$	—	53.8	—	34.2	0.64
Monopotassium phosphate	KH_2PO_4	—	52.2	—	8.4	0.16
Potassium Sources						
Potassium chloride	KC1	—	—	60.0	116.3	1.94
Potassium nitrate	KNO_3	—	—	46.6	73.6	1.58
Potassium sulfate	K_2SO_4	—	—	54.0	46.1	0.85
Monopotassium phosphate	KH_2PO_4	—	—	34.6	8.4	0.24

* Adapted from: Rader, Jr., L.F., L.M. White and C.W. Whittaker. 1943. The Salt Index—A Measure of the Effect of Fertilizers on the Concentration of the Soil Solution. Soil Science Volume 55, pp 201-218.
** Calculated per unit of N, P_2O_5, or K_2O.

tive burn potential of fertilizers based on equal amounts of nitrogen or equivalents of P_2O_5 or K_2O.

Effects of Soil pH

The term pH expresses the relative concentration of hydrogen(H+) and hydroxyl (OH-) ions in solution. A pH of 7.0 means the hydrogen and hydroxyl ions are equal and the solution is said to be neutral. A pH below 7.0 means the solution contains more hydrogen ions than hydroxyl ions and is said to be acid. Similarly, a pH above 7.0 means the solution contains more hydroxyl ions than hydrogen and is alkaline.

Soil pH may influence nutrient absorption and plant growth through the effect of hydrogen ions and their indirect influence on nutrient availability. In most soils the latter effect is the most significant.

The presence of an element in the soil is no guarantee that it is in a soluble form available for absorption. The concentration of hydrogen and associated ions affects soil reaction and the formation of soluble and insoluble compounds. All nutrients must be

The presence of an element is no guarantee it is available to plants.

soluble to be available for root absorption.

Each nutrient has a pH where it is most available because it forms a large proportion of soluble compounds at that particular pH range. See Figure 2 for pH ranges and availability of nutrients.

Plant species differ in their response to the soil acidity

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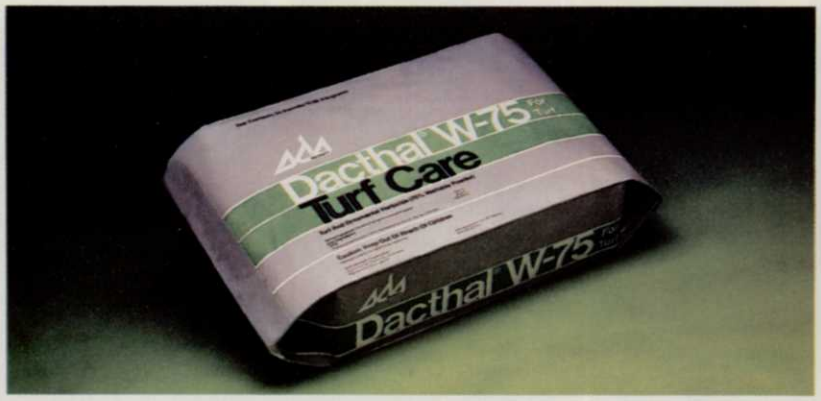

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Go with the best in 1984. Dacthal W-75.

Dacamine® 4D herbicide. Kills perennials better than ordinary 2,4-D. Dacamine 4D virtually eliminates the possibility of weed regrowth. It works particularly well on plantain and 70 other tough perennials.

Dacamine 4D also delivers broader spectrum weed kill than ordinary 2,4-D.

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Daconate® 6 and Bueno® 6 post-emergent herbicides. Proven performers. Especially effective on such tough weeds as nutsedge, chickweed, wood sorrel, crabgrass and many other grassy weeds.

Both products are ready-to-use liquids with built-in surfactants for uniform wetting (Bueno 6 is sold only in western states for use on turf).

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