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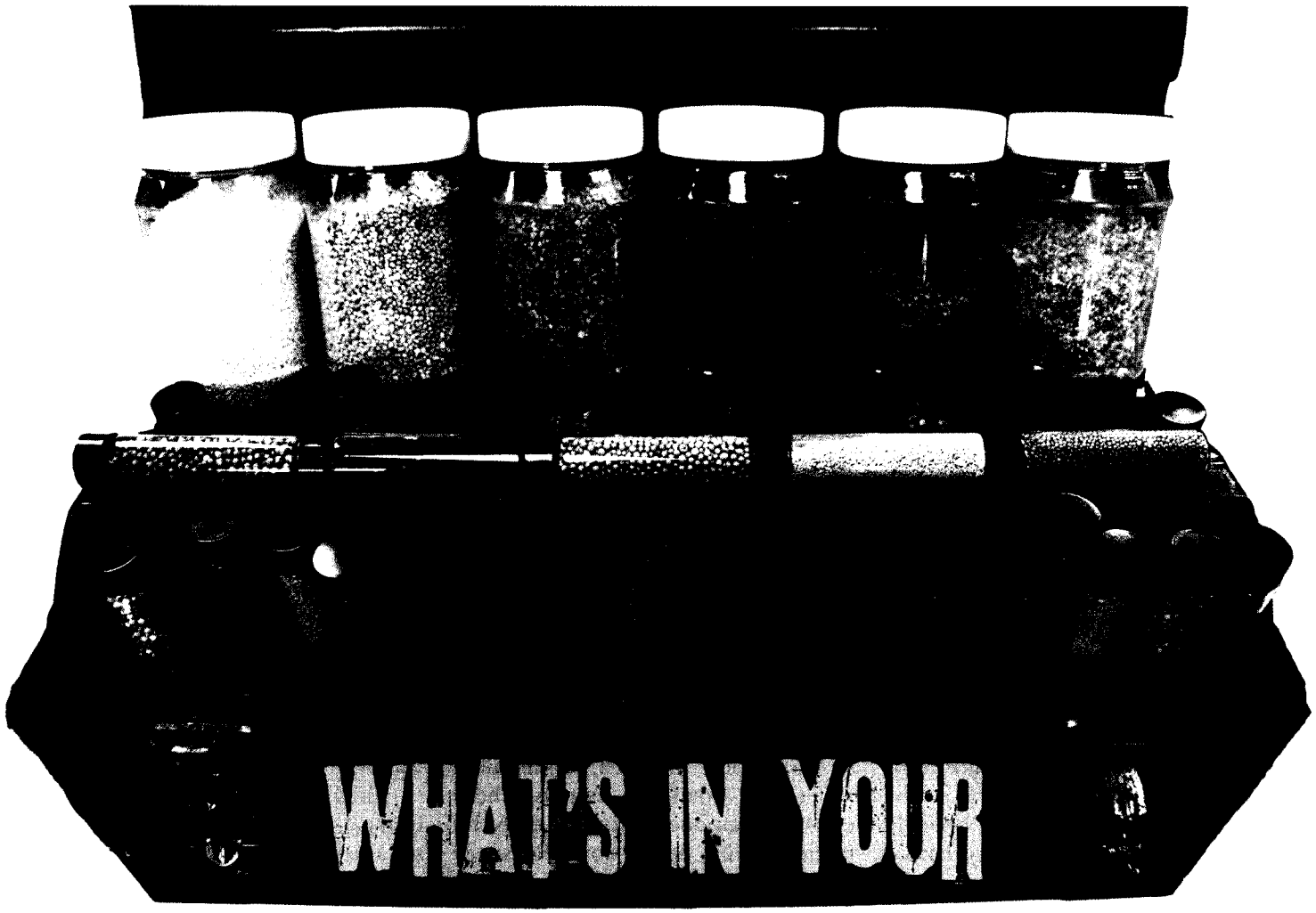

WHAT'S IN YOUR FERTILIZER TOOLBOX?

ADVANCES IN SOLID AND LIQUID FERTILIZERS HELP GROWERS DELIVER COST-EFFECTIVE QUALITY

By Dr. James Robbins, Extension Specialist, University of Arkansas CES
Photos by Lisa Norwood

How many of us remember growing plants in metal cans, or the days when the only option for weed control was pulling them by hand?

With that historical picture in mind, let's revisit where we have been and see what lies ahead for our "fertilizer toolbox."

In metal-can/hand-weeding days, container nurseries used either water-soluble fertilizers injected into the irrigation water (fertigation) or quick release granular fertilizers, such as urea, ammonium nitrate (AN) or NPK blends (e.g. 13-13-13) containing those short-term nitrogen sources.

There was no significant slow-release fertilizer in our toolbox until the 1960s. The first commercial production of ureaformaldehyde (UF) in the United States came in the late '50s, and some nursery growers started using Blue Chip® in the early '60s.

Fertilizer tool options really started to appear in the late '60s. MagAmp® by the W.R. Grace Company (prelude to the combined Grace-Sierra company) gained in popularity, and in the late 1960s, IBDU® was introduced to the U.S. market. Many Pacific Northwest field and container growers have used blends such as 18-5-10 and 16-5-11 that contained the white, chunky IBDU.

Coated slow-release fertilizers break new ground

Probably the most significant contribution to our toolbox came in 1967 when Sierra Chemical Company introduced Osmocote®, the first coated slow-release fertilizer, to the United States. Osmocote, now sold by the Scotts Company, was a major advance for the nursery industry.

Initially intended for the turf market, sulfur-coated urea (SCU) started to

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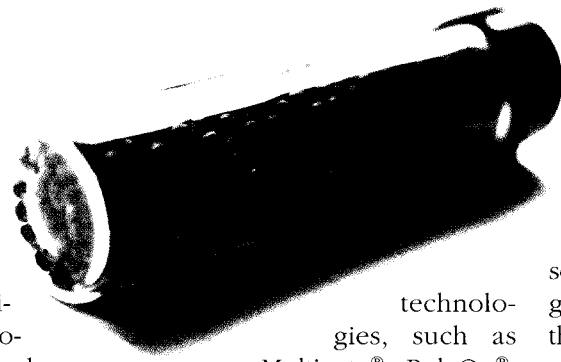

be used in the mid '70s, primarily in short-term topdress products. There was a lag in major advancements until the mid-'80s when two Japanese companies, Chisso and Asahi, introduced a variety of coated slow-release technologies to the U.S. market under brand names such as Nutricote®, Prokote®, Meister®, and Escote®.

These different brands offered a broad selection of fertilizers with a polymer coating that could release nutrients for up to a year or more (Type 360) in many parts of the country. The thought that a single fertilizer application could last at least one growing season — with a dramatic reduction in labor — was major news for the nursery industry!

The floodgates began to open in the '90s with a flurry of new coated technologies, such as Multicote®, PolyOn®, VCote®, and Duration®. The "green prill" PolyOn®, initially manufactured by Pursell Technologies Inc. (now Agrium Advanced Technologies), is sold in the West under the Apex brand name.

The industry then moved from coating simple to more complex substrates. Initially, many polymer coated fertilizers only offered single nutrient sources such as urea, ammonium sulfate, or potassium nitrate. These coated components could then be blended with other slow-release or soluble nutrient sources to offer a wide array of affordable blended fertilizers.

Having these slow-release and soluble components available meant a grower had access to lots of options in their fertilizer toolbox.

Manufacturers also coated homogenous fertilizer substrates (NPK's), which meant that every prill contained the same nutrient composition. Homogenous substrates offered some advantages.

The impact of nutrient segregation was eliminated, and because of that, homogenous fertilizers became ideal for fertilizing smaller containers where the number of fertilizer prills per pot was very small.

Another advancement put minor elements under the polymer coating so a complete spectrum of nutrients

(macro and micro) could be provided to a plant in a slow-release form.

The time machine

Looking forward in time, what new "tools" will we have in our fertilizer toolbox? Advances on the dry granule side are more likely than the liquid side.

Certainly, polymer coatings will continue to dominate the market as new advances in polymer chemistry are identified throughout the world. Coated technologies from China and Europe will appear in the marketplace in the near future.

Many of the concepts used in the slow-release fertilizer industry are adaptations from concepts/technologies developed in the pharmaceutical world (e.g. contact time release capsules; microencapsulation technologies). This year's introduction of Plantacote® from X-calibur is one example of continued interest in coated slow-release technologies.

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Our future granular slow-release tools will not only rely on coating technologies, however. Other methods will continue to be developed that cause chemical reactions to slow nutrient release. An example of this is the Crystal Green® fertilizer currently under development by Ostara Technologies (Victoria, B.C.).

Liquid fertilizers taking the slow road

To apply liquid fertilizer, nursery growers have traditionally used soluble salts in liquid form (urea-ammonium nitrate or UAN for example). What is hard to grasp is the concept

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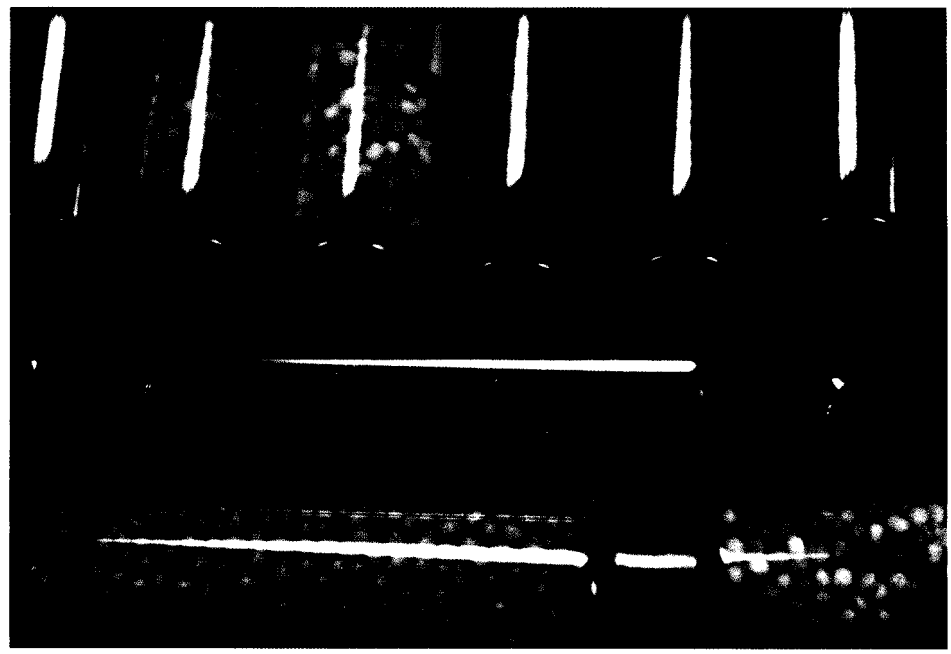

that a liquid can be considered a slow-release fertilizer (Slowly Available Water Soluble, or SAWS).

The introduction of slow-release nitrogen solutions, or "suspensions," is a side benefit of the intensive work on urea-formaldehyde reaction products. These short chain UF polymers (or cyclic products such as Triazone) are a useful "tool" for nursery growers for several reasons.

First, they provide some increased safety over traditional water-soluble salts. Second, they are ideal for growers finishing or shipping a crop, wanting to provide some slow-release nutrients without worrying about losing prills from the media surface during handling or shipping. This may become more crucial if the industry moves toward a pay-by-scan system. Common solutions sold in the Pacific Northwest are Nitamin 30L (sold by Wilbur-Ellis as N-Demand), Trisert®, and CoRoN®.

Fertilizer delivery systems being developed

The traditional way to deliver dry granular fertilizers to containers is fairly low-tech, involving bare hands as "calibrated" scoops or homemade delivery systems using a funnel-and-tube with a "spoon."

Even with mixing and filling

"Hopefully in the near future, the same container handling systems that will move, space and shear container-grown crops can be used to automatically apply fertilizers and chemicals directly into a pot without manual labor."

machines, unless prilled fertilizers were incorporated, many growers had to modify equipment to deliver fertilizer as a topdress. A number of hand-held fertilizer delivery systems have been on the market for several years, including Select-A-Feed™, E-Z Feeder, and Fertil Pak. E-Z Feeder seems to be popular in Oregon since it is fully adjustable and doesn't grind the fertilizer like some other devices, according to Jim McKay at Woodburn Fertilizer/Wilbur-Ellis.

Updated versions of these fertilizer delivery systems are being developed. A number of growers in the Pacific Northwest are using the Fertil™ Dispenser from Agrinomix or the Green Elf® Applicator made in Australia.

Matt Gold at R&S Nursery in Hillsboro, Ore. feels the Green Elf is better suited to dispense fertilizer to one- to three-gallon containers and the Fertil Dispenser better suited for larger containers (5- to 15-gallon). Hines Nurseries and Glenn Walters Nursery are using a unique machine designed to dispense fertilizer over the top to several rows of containers at one time.

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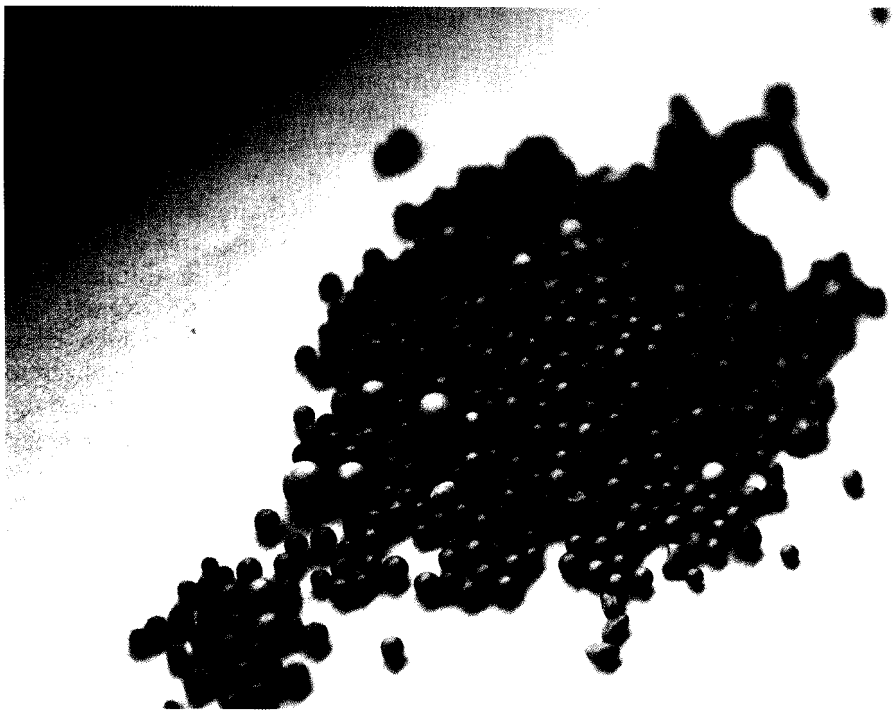

same container handling systems that will move, space and shear container-grown crops can be used to automatically apply fertilizers and chemicals directly into a pot without manual labor.

Taking this short walk down memory lane, we may think we haven't gone too far toward the goal of providing nutrients to plants as needed and in the most efficient way. However, fertilizer companies have made significant strides in that favorable direction.

The future is bright as fertilizer and engineering companies continue to help nursery growers in the Pacific Northwest produce the highest quality plants in a cost-competitive way.

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