

# TECHNICAL NOTES

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## ADVANCES IN FERTILIZER TECHNOLOGY

The September-October 1972 issue of Fertilizer Solutions contains four articles with information that may be useful to conservationists working with various field, orchard, and vineyard crops. References used for information contained in the paragraphs following are:

1. Waters, Raymond L. "Salt Index - Starter Fertilizer Pop Up Applications"
2. Johnson, Don "Polyphosphates, Their True Value"
3. Lohry, L. W. "Interaction of Nitrogen and Phosphates, Uniform Application"
4. Turner, James "Adding Boron to Your Liquid Fertilizer May Add to Your Profits"

In the first reference Dr. Waters discusses the tendency for starter fertilizers to cause seed or seedling damage by increasing salt content of the soil solution around newly planted seedlings. To avoid or minimize salt damage, it is suggested that (1) starter fertilizers be used only on combinations of soil and crop where definite response has been observed; (2) limit starter fertilizer to amounts needed to get plants off to a fast start; and (3) use low salt index fertilizers for starter or pop-up applications.

Dr. Waters pointed out that fertilizers vary considerably in their salt effect and presented the SALT INDEX TABLE following to illustrate this variation.

<u>Material and Analysis</u>	<u>Salt Index</u>
Anhydrous Ammonia 82% N	47.1
Ammonium Nitrate 35% N	104.7
Urea 46% N	75.4
Sodium Nitrate 16.5% N	100.0
Monoammonium Phosphate 12-61-0	29.9
Diammonium Phosphate 21-53-0	34.2
Muriate of Potash 60% K <sub>2</sub> O	116.3

In using the Salt Index one chooses the material(s) having the lowest index number that will meet starter fertilizer requirements of the crop being grown. Salt damage from starter fertilizers could be a very important consideration on soils that are known to be critically high in salts.

In the second reference, Mr. Johnson gives several data summaries showing corn, grain sorghum, and wheat plots giving significantly higher yield responses to liquid polyphosphate than to like amounts of liquid or dry orthophosphate. The data appears to indicate that polyphosphate is more easily available to some crops than other commercial phosphates being used. Much more research is needed to show the various combinations of crop, soil, and other factors under which polyphosphate may be superior. The data given by Mr. Johnson is of interest because most earlier work with phosphate fertilizers has failed to show crop responses consistent enough to indicate differences in crop response from the various commercially available phosphates.

In the third reference, Mr. Lohry explained and illustrated work he conducted to show that equipment available for spreading mixed dry fertilizers is incapable of distributing the material evenly. His data showed that thoroughly mixed dry bulk fertilizer blends become segregated during transfer from mixer to spreader because of differences in volume and mass of the fertilizer particles. Smaller and denser particles tend to move to the bottom of the load and lighter particles to the top. Further segregation occurs as the vehicle is moved to the field. The spreader truck used by Mr. Lohry failed to give uniform distribution within the field in two trials even though factory instructions were followed in operating the "spinner applicator" equipped truck. Pans evenly distributed over the field had more than 4-fold differences in weight of fertilizer collected. Chemical analysis of fertilizer collected by the pans showed up to 6-fold differences in amounts of individual plant nutrients, and 30 to 40 percent variations appeared quite frequently.

Mr. Lohry's work would tend to indicate that broadcast application methods for bulk dry blended fertilizers may often fail to give the uniform application of plant nutrients needed for top yields and maximum efficiency of fertilizer use. Unused plant nutrients resulting from unevenly applied fertilizers may well be a significant source of the high nutrients found polluting runoff and ground waters from some of our intensively cultivated and fertilized lands. The procedure of distributing pans to collect and weight samples would appear to be a practicable method of testing uniformity and rates of broadcasting dry fertilizers.

In the fourth reference, Mr. Turner points out that boron is the micro-nutrient most frequently found deficient in soils of the United States.

A map indicating boron deficiency shows that in the west, Washington, Idaho, Western Montana, Western Oregon, and Northern California, all have extensive areas of boron deficient soils. Agriculturists in all areas need to keep a close watch for boron deficiency symptoms in crops because new areas of deficiency are showing up each year.

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