

Product Formulation Can Make a Difference!



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Regardless of the chemical classification, all pesticides (fungicides, herbicides, and insecticides) are manufactured in their relatively pure form (i.e., technical grade material). The next step in the manufacturing of pesticides is product formulation. Product formulation involves the processing of the technical grade material into usable form for dilution or direct application.

In the United States, pesticides are sold in over 35,000 formulations. Pesticide formulations are designed (engineered) to improve efficacy (performance), application, handling, properties of storage, and safety.

However, the true test of a pes-

ticide formulation is by the end-user! To be accepted, pesticides must be formulated into usable forms that are effective, economical, easy to handle and apply, satisfactory for storage, as well as safe to the applicator and the environment. Unfortunately, these goals are not easily accomplished. Factors such as chemical and physical properties of technical grade material often make pesticide formulating a challenge.

For example, some pesticides in their raw form are either liquids or solids; some are stable to air and sunlight while others are highly unstable; some are volatile, while others are not; some are oil sol-

uble, and others are insoluble in water and/or oil. As a result, one or a combination of these characteristics can present difficult obstacles to overcome in order to develop product formulations that are widely accepted by the turfgrass industry.

Turfgrass pesticides used in the United States are manufactured in various formulations including:

1) Sprays

- a. Emulsifiable Concentrates (EC)
- b. Water-Miscible Liquids (L)
- c. Dry Flowable (DF)
- d. Wettable Powders (WP)
- e. Water Soluble Powders (SP)

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- f. Water Dispersible Granule (WDG)
 - g. Soluble Concentrate (SC)
 - h. Oil Solutions
 - i. Soluble Pellets
 - j. Flowables (F)
- 2) Granulars (G)
 - 3) Pesticide/Fertilizer Combinations
 - 4) Baits (Insecticides only)

Depending on the target pest, product formulation can greatly affect the performance of a pesticide. For example, surface feeding insects such as sod webworms are foliage-feeding insects that consume turfgrass leaf tissue; thus, sprayable insecticide formulations typically perform better than granular formulations since the product adheres to the turf foliage that the insect ultimately eats.

Conversely, other turfgrass pests such as crabgrass are most effec-

tively controlled preventatively with granular herbicide formulations. The granular herbicide merely creates a barrier that terminates germinating crabgrass seedlings. Specific sectors of the turfgrass industry also have vastly different product formulation needs. For example, the lawn care industry rarely has the luxury of required, immediate post-application irrigation following preventative white grub control treatments; thus they have an earnest need for an insecticide formulation that is not dependent on immediate application of water for effective control. Whereas a golf course superintendent frequently uses relatively low application rates (i.e., spray volumes often below 1 gallon per 1000 ft²) and has a need for sprayable insecticide formulations that can be applied at relatively low spray volumes and yet provide effective control of the target pest.

Over the past decade, several new product formulations have been introduced to the turfgrass industry. These formulations have provided valuable attributes and characteristics that fulfill criteria demanded by turfgrass managers. Such formulations include granular formulations like Biodac (a paper-waste pulp that is dustless) and DG-Lite and -Pro (a combination of calcium carbonate and wood flour that is bound together with a water soluble binder that allows the granule to effectively disperse with nominal water) as well as sprayable formulations including water dispersible granules (WDG), dry flowables (DF), and water soluble packets (WSP). Be sure to consider the biology (i.e., life cycle, location, habits or behavior, vulnerable life stage, etc.) of the target pest when selecting the appropriate product formulation. ♣



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