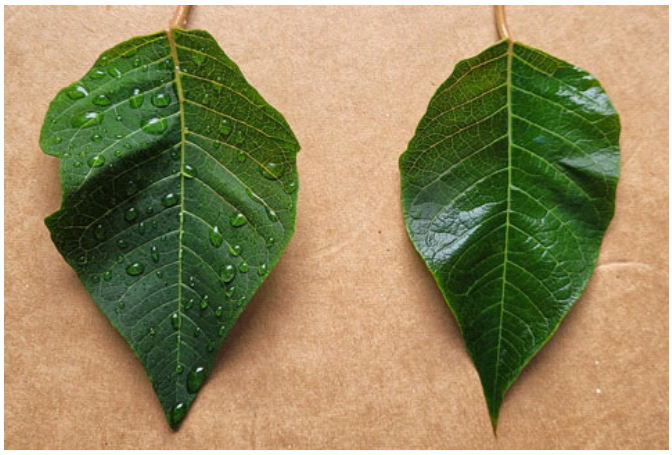
GROWERTALKS

Features

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Surfactants vs. Wetting Agents

Josh Henry



The terms “surfactant” and “wetting agent” are often used interchangeably in commercial greenhouse production. Wetting agents and surfactants have many similarities, each playing a role in how water interacts with a plant or the substrate. But there are distinct and important differences between the two products.

Surfactants are a type of adjuvant that help improve spray application coverage in several ways, such as wetting, spreading and sticking. Some surfactants also aid in vegetative propagation by evenly distributing water across the leaf and preventing desiccation.

Wetting agents often include surfactants in their formulation, but they are specifically used to improve substrate moisture management.

Figure 1. Droplets form on leaves sprayed with water alone (left), but water with a surfactant spreads evenly across the leaf (right).

Adjuvants

Let’s start by discussing a term I used above: “adjuvants.” These are substances used to increase the efficacy, performance, uniformity or safety of a pesticide application. There are many different types of adjuvants, including surfactants, activators, compatibility agents, buffers, acidifiers, deposition aids, indicator dyes and more. Terms like “wetting agent” and “spreader-sticker” are also used to describe specific types of adjuvants that may fall into one or more adjuvant classes. These terms are often used interchangeably, and while it may seem like semantics, understanding the differences among these various products is essential for proper implementation.

Surfactants

Commercial greenhouse production utilizes many types of adjuvants, and surfactants are among the most important. They can help break surface tension, allowing spray droplets to spread more uniformly over a leaf and penetrate through the cuticle (Figure 1). Surfactants can be classified as nonionic (having no charge), anionic (having a negative charge), cationic (having a positive charge) or amphoteric (having both negative and positive charges). The charge affects how the surfactant interacts with other chemicals in a spray tank, so choosing the correct surfactant is crucial for optimizing chemical applications.

Nonionic surfactants are the most common for greenhouse use, as positively or negatively charged surfactants can each react with other chemicals in the spray tank or damage the plant directly. For instance, quaternary ammonium compounds are a type of cationic surfactant and they're particularly good at disrupting cell membranes. This makes them an excellent choice for disinfecting surfaces, but not so great for spraying on plants. Organosilicone surfactants are a specific formulation of nonionic surfactant that are particularly good at spreading and penetrating waxy surfaces like the cuticle of a leaf.

Not all surfactants act the same. Most can be defined by their relative impact on the physical characteristics of the spray solution and how it interacts with the surface of the leaf. Most surfactants offer some combination of activity, including breaking the surface tension (wetting), distributing solution across the surface of the leaf (spreading) and helping solution adhere to the surface of the leaf (sticking). Hence, it's common to see surfactants marketed as "wetter-spreaders" or "spreader-stickers." The specific ingredients and formulation are responsible for these characteristics.

Wetting agents

The term "wetting agent" is often used to refer to two distinct applications in the greenhouse. While spray adjuvant surfactants are often referred to as wetting agents, the proper use of the term is to describe substrate amendments that improve substrate water distribution, prevent water repellency and aid in rewetting. While these often contain surfactants, they're distinctly different from spray adjuvant surfactants that are applied directly to plants. Spray adjuvant surfactants are often referred to as "wetter-spreaders" or "spreader-stickers" based on their function, but are often incorrectly termed as wetting agents as well. It should be clear that a true substrate wetting agent isn't interchangeable with a spray adjuvant surfactant.

While surfactants used as spray adjuvants and wetting agents have a lot in common, there are some crucial differences to keep in mind when selecting the right product to fit your needs. Surfactants can aid in chemical spray applications, improving pesticide coverage and absorption. Certain surfactants can also be used to enhance misting during propagation, spreading water over the leaf and preventing desiccation. Wetting agents are a similar class of products that are intended specifically for use in the substrate. **GT**

**Always read and follow labels to ensure products are compatible with your intended application.*

Josh Henry is a Technical Services Specialist for Ball Seed Company.