

Adjuvants Enhance

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sold to alter pesticide-soil interactions, the emphasis of this discussion will be on foliar applied materials. The primary use of activator adjuvants is with postemergence herbicide applications.

Before any foliar-applied

herbicide can perform the desired biological function, it must be transferred from the leaf surface into the plant tissue. The above ground portions of plants are covered by a continuous non-cellular, non-living membrane called cuticle. Cuticle is the first barrier that

any herbicide must overcome in order to be effective. The plant cuticle is composed of water repellent waxes consisting of mixtures of long-chain alkanes, aldehydes, ketones, esters, alcohols, and fatty acids. Other components include cutin, which is cross-linked



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hydroxylated fatty acids, and pectins which can provide pathways for more water soluble pesticides. The structure of plant cuticle can be likened to a sponge where the matrix of the sponge corresponds to the cutin and the holes correspond to the embedded wax. The surface of the sponge is also covered with wax (epicuticular wax). Cuticle is extremely heterogeneous and varies greatly between different species of plants.

Waxes are the principal barrier restricting herbicide movement into plant foliage. However, the chemical or physical

properties of the wax appear to be more important in restricting penetration than thickness. Surface wax high in hydrocarbons, aldehydes, and ketones is less permeable to water and most herbicide sprays than cuticle membranes high in more polar waxes such as esters and alcohols. For example, the surface wax of common lambsquarters is known to be a strong barrier to herbicide penetration. Lambsquarters cuticle wax is high in aldehydes which may help prevent the passage of more polar (e.g. water soluble)

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Table 2. Effectiveness of adjuvants¹ in selected weed trials at Penn State.

Treatment	Wirestem mehly ²	Giant foxtail ³
	----(% control)----	
Accent + NIS	67	-
Accent + COC	73	-
Accent + MVOC	78	-
Pursuit + NIS	-	78
Pursuit + COC	-	95
Pursuit + DASH	-	94
Pursuit + DASH + UAN	-	99

¹ NIS = nonionic surfactant; COC = crop oil concentrate; MVOC = methylated vegetable oil concentrate; DASH = surfactant from BASF; UAN = 28% urea ammonium nitrate.

² Accent applied at 2/3 oz./A and averaged over two locations.

³ Pursuit applied at 4 oz./A

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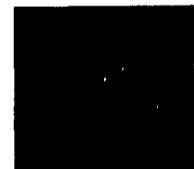
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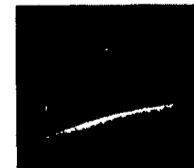
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