

CORN TALK NEWS

PENNSYLVANIA MASTER CORN GROWERS ASSOC., INC.

Adjuvants Enhance

(Continued from Page 9)

(water = 1 and 30W motor oil = 300). Crop oils are 95 to 98 percent oil with 1 to 2 percent surfactant/emulsifier.

Crop oils are believed to promote the penetration of pesticide spray through waxy cuticle or the tough chitinous shell of insects. The oils may also be important in helping solubilize more non-polar herbicides such as Poast, Fusilade, and atrazine on the leaf surface. Traditional crop oils are more commonly used in insect and disease control than with herbicides. Crop oils are typically used at 1 to 2 gallons per acre.

Crop oil concentrate contains 80 to 85 percent phytobland emulsifiable crop oil (petroleum based) plus 15 to 20 percent nonionic surfactant.

The purpose of the surfactant in this mixture is to emulsify the oil in the spray solution and lower the surface tension of the overall spray solution. Crop oil concentrates attempt to provide the penetration characteristics of the oil while capturing the surface tension reduction qualities of a surfactant. Crop oil concentrates are used at 1 to 3 pints per acre.

Traditional crop oil concentrates have been petroleum based. However, recent introductions have also included plant or vegetable based oil concentrates. Vegetable oil concentrates have often been less consistent than their petroleum based counterparts. However, more recently manufacturers are attempting to improve plant or vegetable based oils by increasing their non-polar or lipophilic characteristics.

The most common method has been through esterification of common seed oils. Methylated sunflower, soybean, cotton, and linseed oils are commercially available as oil concentrates. The methylated forms of these seed oil concentrates are comparable in performance to traditional crop oil concentrates, so their importance may increase in the future.

In taking it one step further, organosilicone based methylated vegetable oil concentrates are also available. These adjuvants boast the surface tension reducing properties of silicone plus have the advantages of a methylated vegetable oil concentrate. The more widely available oil-based additives are given in Table 4.

Liquid Fertilizer

Within the last 10 years, liquid fertilizers are more frequently added to the spray solution as an adjuvant to increase herbicide activity. Ammonium salts (NH₄⁺) appear to be the active component of these fertilizer solutions and have improved the performance consistency on some weeds. It is still unclear how ammonium salts improve herbicide performance. Herbicides that appear to benefit from the addition of ammonium are the relatively polar, weak acid herbicides such as Basagran, the sulfonyleureas (Accent, Beacon, Classic, and Pinnacle), and the imidazolinones (Pursuit).

Fluid fertilizers may replace surfactant or crop oil concentrate with some of the contact-

type herbicides, but are usually added in addition to surfactant or crop oil concentrate with systemic products.

Velvetleaf in particular has been responsive to the addition of fluid fertilizer in the spray mix. In general, velvetleaf control has improved by as much as 10 to 25 percent by the addition of an ammonium based fluid fertilizer (28, 30, or 32 percent UAN, 10-34-0, or 21-0-0) compared to crop oil concentrate or surfactant. Common rates are one gallon per acre of 28, 30, or 32 percent UAN, one quart per acre of 10-34-0, or 17 pounds per 100 gallons dry ammonium sulfate.

Some broadleaves and grasses show little or no response with the inclusion of ammonium fertilizer solutions. See Table 5 for a list of appropriate adjuvants with foliar-applied corn or soybean herbicides.

Summary

The type of adjuvant added to the spray tank can enhance or reduce the performance of the pesticide. Both herbicide and species will influence the appropriateness of the adjuvant.

Although there are a number of different kinds of activator adjuvants on the market, the primary purpose is to reduce the surface tension, improve the wetting, and increase the penetration of the pesticide.

In order to choose the correct additive for a specific product, first read the pesticide label. The wrong adjuvant increases the risk of poor performance and crop injury. An appropriate adjuvant will assure maximum performance and crop safety.

References

Chow, P.N.P., C.A. Grant, A.M. Hin- (Turn to Page 11)

Table 5. Spray adjuvants for post corn and soybean herbicides.

Herbicide	Additive ¹
Corn	
Atrazine	COC
Accent	NIS or COC ± UAN
+ Atrazine	COC ± UAN
+ Banvel or Marksman	NIS ± UAN
+ Buctril or	NIS ± UAN
+ Buctril/atrazine	
Beacon	NIS or CCC or VOC±
	YAN
	NIS
+ 2,4-D or	
+ Banvel or Buctril	NIS or VOC ^{2,3}
Bladex or Extrazine DF	NIS or UAN ³
Banvel or Marksman	NIS or COC±
Clarity	UAN ³
	COC or VOC or UAN
Laddok or	
Basagran + atrazine	UAN
Laddok + 2,4-D LVE	

Soybeans

Broadleaf	Additive ¹
Basagran	COC or VOC or UAN
Blazer	NIS or UAN
Classic	NIS or COC + UAN
Cobra	NIS or COC or UAN ⁴
Galaxy	COC or UAN
Pinnacle	NIS or COC ⁵ + UAN
Pursuit	NIS or COC or VOC or DASH + UAN
	NIS or COC + UAN
	NIS
	NIS or COC or UAN
Grass	
Assure II	NIS or COC
Fusilade	NIS or COC or VOC + UAN
	NIS or COC or VOC + UAN
Fusion	NIS or COC or VOC + UAN
Poast	COC or VOC or DASH + UAN
Poast Plus	COC or VOC or DASH + UAN
Select	COC

¹NIS = nonionic surfactant; COC = crop oil concentrate (petroleum based); VOC = vegetable oil concentrate (plant based); UAN = urea-ammonium nitrate; DASH = BASF Adjuvant.

² Only under drought conditions.

³ Increases injury potential.

⁴ Use NIS if greater than 80% relative humidity

⁵ Use COC only under dry conditions

Farm Safety



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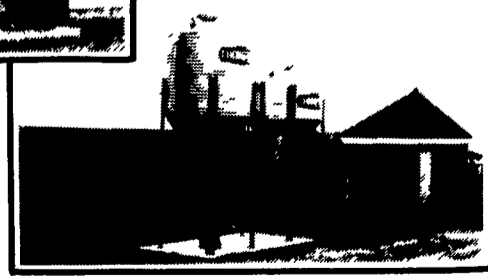
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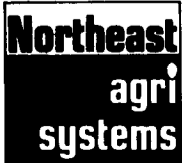
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