THE INTERACTION OF STAPLE AND CGA 362622 WITH BOLL WEEVIL ERADICATION APPLICATIONS OF MALATHION

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Abstract

As a selective postemergence over the top (POST) herbicide labeled in cotton, pyrithiobac {2-chloro-6-[4,6-dimethoxy-2-pyrimidinyl)thio] benzoic acid} controls several problematic weeds including pitted morningglory (*Ipomoea lacunosa* L.), entireleaf morningglory (*Ipomoea hederacea* var. *integriuscula* Gray), common cocklebur (*Xanthium strumarium* L.), velvetleaf (*Abutilon theophrasti* Medik.), and hemp sesbania (*Sesbania exaltata* (Raf.) Rydb. Ex A.W. Hill). Pyrithiobac is applied as an early POST treatment, which coincides with the application of many insecticides. One of these insecticides is malathion {O,O-dimethyl s-(1,2-dicarbethoxyethyl) phosphorodithioate}, which is the current insecticide of choice for the boll weevil (*Anthonomus grandis* Boheman) eradication program. These classes of pesticides can induce beneficial or detrimental interactions when used in combination with herbicides. CGA-362622 is a broad spectrum ALS inhibiting herbicide with the proposed common name of trifloxysulfuron sodium. Previous research with CGA-362622 has shown similar effects as pyrithiobac in postemergence applications. It is suspected that the presence of malathion in cotton plants affects the ability of the plant to metabolize the active parent herbicide molecule into inactive metabolites.

There has been concern over these interactions in certain areas of Mississippi and other states currently involved in boll weevil eradication programs because of the uncertainty of when malathion applications will be made relative to pyrithiobac and potential CGA-362622 applications on various production areas. Producers using pyrithiobac and CGA-362622 based weed control programs in boll weevil eradication areas have no way of knowing when malathion applications will be made or whether an interaction may occur. Producers need to know the essential time interval between insecticide and herbicide applications to ensure crop safety. Research has shown there to be a detrimental interaction between applications of malathion and these herbicides when applied to cotton. Previous research has shown significant visual injury, but this injury has had little effect on fruiting or yield. In these studies, malathion was applied in high volume applications and also as a tank mix with pyrithiobac. Further laboratory research has shown increased injury when pyrithiobac and malathion are applied in cool conditions. Therefore, the objectives of this research were to determine the interaction of applications of pyrithiobac and CGA-362622 made at various time intervals before and after ultra low volume (ULV) malathion applications under field conditions. Research was conducted in 1999 and 2000 at the Plant Science Research Center near Starkville, MS, and the Black Belt Branch Experiment Station near Brooksville, MS, to evaluate ULV applications of malathion with pyrithiobac and CGA-362622. Aerial malathion applications were made by the Southeastern Boll Weevil Eradication Foundation at 0.76 lbs ai/A. Applications of 1.0 oz ai/A pyrithiobac and 0.076 oz ai/A CGA-362622 were made with a CO_2 backpack sprayer delivering 15 gallons per acre. Treatments consisted of topical applications of pyrithiobac and CGA-362622 at 24, 8, 4, 2, 1, 0.5 h before or 0.5, 1, 2, 4, 8, and 24 h after the malathion application. The pyrithiobac and CGA-362622 treatment was applied within 5 minutes of the malathion treatment at the 0-h time interval. Data included visual injury (0-100 scale), nodes above white flower (NAWF), nodes above cracked boll (NACB), and yield in the pyrithiobac experiment. In the CGA-362622 experiment, data included visual injury (0-100 scale) and yield. No visual injury was observed at 7, 14, or 28 DAT rating intervals. NAWF, NACB, and yield exhibited no significant difference between treatments. The results of these preliminary studies indicate that there is no detrimental effect of ULV malathion applications made to cotton when pyrithiobac and CGA-362622 have been applied. The reason these results differ from previous research may be due to using an ultra low application volume rather than standard (e.g. 15 GPA) application volumes of malathion, and no tank true tank-mixture. Also, lower injury may be the result of applications being made under warmer field conditions. These data indicate that ULV malathion applications applied at the rates used by the BWEP in Mississippi do not adversely interact with pyrithiobac or CGA-362622 applications.

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