

2025 Advanced Crop Advisor Workshop
The Good, the Bad, and the Ugly of Pesticide Pre-Mixtures Handout

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Many pesticides used in field crops are sold as pre-mixtures. In this presentation, general aspects of pesticide mixtures ranging from good to bad to ugly will be discussed.

The good of pesticide mixtures includes aspects such as:

- Broader spectrum of pest species controlled.
- Pesticide resistance management (if >2 sites of action).
- Reduced quantities of packaging materials.
- Reduces size of pesticide storage area.
- Easier to use, especially if only one use-rate.
- Can allow for synergistic efficacy.
- Saves time loading sprayer having fewer containers.
- Allows incompatible pesticides to be in a single container.
- Control the active ingredients and rates for a product.
- Pre-mixtures usually cost less than tank-mixing.
- Allows for specific adjuvants to be included in pre-mixture.
- Allows creation of new patented product.

The bad of pesticide mixtures includes aspects such as:

- Financial gain by manufacturer to include active ingredients with limited efficacy.
- Not always having correct rate of each active ingredient in pre-mixture.
- Allows users to become complacent about what active ingredients are included in pre-mixture.
- Adding a different active ingredient to pre-mixture may cause compatibility issues.
- Advertisements for pre-mixture trade names say little to nothing about what active ingredients and rates are in the pre-mixture.
- Using the highest rate of a pre-mixture may preclude the use of one of those active ingredients in a second application.

The ugly of pesticide mixtures includes aspects such as:

- Multiple and/or cross-resistant pests.
- Antagonism of the active ingredients in the pre-mixture.
- Complacency of farmers not knowing what active ingredients and concentrations are in pre-mixtures.

****See second page for examples of concerns with use of pesticide pre-mixtures.**

Insecticide concerns:

- Effects of a reduced rate of an individual active ingredient in a pre-mixture. Example:
 - Sefina rate to control soybean aphid should be 3.0 fluid ounces/A provides 0.0098 lb ai/A of the active ingredient afidopyropen.
 - The pre-mixture Renestra applied at 6.8 fluid ounces/A only contains 0.0090 lb ai/A of afidopyropen.
 - Therefore, Renestra has 8.2% less afidopyropen than recommended to control soybean aphids, potentially leading to selection of afidopyropen-resistant soybean aphids.
- Most newer insecticides are toxic to fewer insect species compared to most previous insecticides, usually reducing harm to beneficial insects and the environment, but when these newer insecticides are mixed with active ingredients of older insecticides that usually are more harmful to beneficial insects and the environment, these pre-mixtures reduce the positive benefits of these newer insecticides.
- 2024 University of Minnesota research data from Rosemount, MN showed Leverage 360 at 2.8 fluid ounces/A, a premixture of beta-cyfluthrin (Baythroid XL [3A]) and imidacloprid (Admire Pro [4A]) failed to control soybean aphids due to the soybean aphids being resistant to beta-cyfluthrin and the rate of imidacloprid in the pre-mixture inadequately controlled these soybean aphids.

Herbicide concerns:

- Using a high rate of a pre-mixture herbicide could preclude the use of an effective rate of one or more of the active ingredients in a second herbicide application. Example:
 - Fierce EX (8 fluid ounces/A) applied to soybeans provides only 0.119 lb ai/A of pyroxasulfone.
 - If the field has a coarse soil texture, no more pyroxasulfone may be applied for the season.
 - If the field has a medium or fine soil texture, pyroxasulfone may be applied postemergence at 0.067 lb ai/A since the seasonal maximum rate of pyroxasulfone is 0.186 lb ai/A. NDSU research shows the minimum rate of pyroxosulfone needed to effectively control waterhemp in soybeans is 0.114 lb ai/A. Therefore, pyroxasulfone should not be applied postemergence to this soybean field due to the remaining pyroxasulfone rate will not effectively control waterhemp.
- Herbicide pre-mixtures may not contain a high enough rate of one or more active ingredients in the pre-mixture to effectively control one or more weed species. Example:
 - If dicamba-resistant kochia is present in a wheat field, which is likely in most North Dakota fields since dicamba-resistant kochia was first confirmed in 1995, what is the recommended rate of Starane Ultra for kochia control? The Starane Ultra label recommends the use of 0.4 pint/A which provides 0.14 lb ai/A of fluroxypyr, the active ingredient in Starane Ultra.
 - NDSU research shows Huskie FX should be applied at 18 fluid ounces/A postemergence to less than 3 inches tall kochia in hard red spring wheat to control kochia. Huskie FX applied at 18 fluid ounces/A, only contains 0.08 lb ai/A of fluroxypyr, 0.06 lb ai/A less than recommended on the Starane Ultra label to control dicamba-resistant kochia. Therefore, Starane Ultra should be added to Huskie FX (18 fluid ounces/A) at a minimum rate of 2.6 fluid ounces/A to maximize kochia control.