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Aerial Application Tips for "*Rust*" Control

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Any spray platform should be able make efficient and efficacious applications for rust control. Aerial application platforms (helicopters and fixed wing) are well suited because of their speed – for timely applications, ability to work under wet field conditions, and do not compact the soil or disturb the crop. The following is a set of guidelines that should make aerial applications most productive.

- All applications must be made uniformly over the entire crop.
  - Make sure the aircraft is utilizing the optimum swath width.
  - Avoid misses around obstructions.
  - Dress headlands to get those areas around trees and power lines.
  - Do not plant areas that cannot be effectively treated by aircraft. Work with your applicator to determine where these areas are – plow them up if necessary to avoid hot spots.
- Utilize the optimum application height.
  - Most turbine aircraft need to be operated with the spray boom 10-12 feet above the crop canopy – and the very large (660 to 800 gallon capacity) aircraft even higher.
  - Both, lower and higher, release heights may reduce pattern uniformity and increase drift potential.
- Don't spray during the heat of the day if possible. As the more and more energy is absorbed into the canopy, it becomes more difficult to pass the smaller droplets through the strong micro-inversion layer that forms at the top of the crop.
- Utilize nozzles that control droplet spectrums well. Choose nozzles that make as few droplets as possible below 200µ (microns).
- Years of work in heavy canopies indicate the droplet spectrums should be targeted in the 285-335 VMD (volumetric median diameter – where ½ of the spray volume is that size or larger and ½ of the spray volume is that size or smaller) range.
  - Droplet spectrum may be the most important aspect of these applications and should be carefully adjusted with nozzle selection, operating pressure, and mounting configuration.
  - Small changes in droplet diameter make big changes in droplet volume! (Example: It takes (1.6) 300µ droplets to equal (1) 350µ droplet and (2.4) 300µ droplets to equal (1) 400µ.)
  - There are excellent aerial models available to help determine the expected droplet spectrum. http://apmru.usda.gov/downloads/downloads.htm
- Data from South America indicates that aerial applications with 2 GPA – water carrier (250µ VMD) and ½ GPA – oil carrier (150µ) have worked very well. Researchers from S. America also caution that ground applications may spread spores and are difficult to utilize when field conditions are wet and susceptible to disease development.
- Almost all applications may be enhanced with wind, particularly application crosswinds, – to help mix the material down into the lower portions of the canopy.
- Aircraft speed changes the droplet spectrum.
  - The optimum droplet spectrum can generally be developed by selecting the appropriate setup configuration.
  - Turbine powered, faster aircraft, generally have more uniform patterns.
  - It may be more difficult for faster aircraft to work around some obstructions.

- Total spray volume per acre will be somewhat dependent on crop canopy structure. Three GPA is suggested as a minimum an optimum being in the 5-7 GPA range. There is generally a lot of disagreement on this issue, with a lot of opinions leaning toward more water. Canopy penetration and deposition studies just haven't indicated a strong need for more diluent volume.
- The use of adjuvants and surfactants may be very beneficial as spreaders and stickers. Care should be taken to avoid major droplet spectrum changes when these products are being utilized.
- If multiple applications are made, utilize different travel lanes or go in the opposite direction to move droplets into the canopy at different angles.