A HIGH-TECH APPROACH TO NOZZLE AND ADJUVANT SELECTION

Eric Spandl[1/]

Evaluating and choosing the right spray nozzles and adjuvant for crop protection applications can be a challenge. Many factors, like nozzles and adjuvants, affect the spray pattern and droplet distribution and subsequently potential for drift and product efficacy. Personal observations and field experience are quite useful in evaluating results. Visual evaluation of nozzles of spray pattern and droplet distribution in real time can be useful but provides limited information. You can observe large changes in pattern distribution and if there is significant drift or movement of spray droplets.

Some "high tech" equipment has allowed us to evaluate in much greater detail the affects of nozzles, adjuvants, and other factors on spray droplet size, distribution pattern and movement. A laser analyzer provides a concise measurement of spray droplet size and quantity within a given range. This is especially useful for showing how much of the spray is small droplets, such as those under 105 microns. Droplets this size have a higher potential to move off-target. Laser droplet analysis is useful for showing how various factors affect droplet size. However, presentation is usually limited to tables or graphs.

Other technology has allowed us to develop visual evaluations that support the laser analysis. A high speed camera and strobe provided pictures illustrating individual droplets within a spray pattern. In addition, spray patterns were recorded with a high-speed video camera and played back in slow motion to demonstrate droplet distribution and movement.

TeeJet AI, AIXR, and XR nozzles and various spray mixtures were analyzed with the laser. The above nozzles plus many others were photographed or videotaped. Spray mixtures included water alone, glyphosate herbicide, a simulated adjuvant system for glyphosate, and various adjuvants. In addition, wind absence or presence, was included for photographs and video.

The high speed photography and video provided excellent detail of the spray droplets and distribution in the spray patterns. Individual droplets were visible on photos and could be tracked on videos as they left the nozzle and were moved by wind. Photos and video provide a level of detail not seen by the eye in real time. These forms of evaluating spray pattern and droplet movement provide very obvious and visual evidence that supports the quantitative analysis provided by the laser.

Many factors like nozzles type, nozzle setting (e.g., pressure), spray mixtures, and wind significantly impacted results. However, product performance can be optimized and the potential for drift reduced by selecting the proper nozzle type, adjusting nozzle pressure, and adding the proper adjuvant.

[1/] Agronomist, Winfield Solutions, LLC, 1080 County Road F West, Shoreview, MN, 55126.