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Strategies for reducing herbicide drift

Brent A. Pringnitz
Iowa State University, bpring@iastate.edu

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Abstract
Avoiding excessive spray drift is a key objective for applicators. With increasing acreage planted to herbicide-resistant crops and a shift to more postemergence spraying, the potential for off-target plant damage has increased in recent years. Off-site damage is often readily apparent in adjacent farmland and rural acreages.

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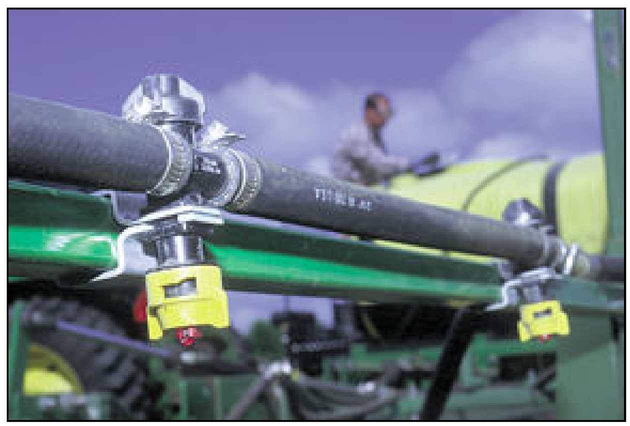
Excessive wind velocity is a dominant factor in drift situations. Several factors in spray equipment setup and operation, however, also should be considered to help avoid spray movement outside the target area. An important concept in reducing spray drift is the use of larger droplet sizes. Larger droplets are less affected by surrounding air and more likely to stay on-course in reaching the selected target.



Nozzle selection is a critical component in reducing herbicide drift. There have been many recent advancements in nozzle technology that can assist in reducing the amount of drift under most field conditions. Two newer nozzle types available are the turbulence chamber nozzles and the air-induction nozzles. Both nozzle types produce larger droplets than conventional flat fan nozzles. The Turbo TeeJet nozzle by Spraying Systems Co. is an example of a turbulence chamber nozzle. Various manufacturers have developed air-induction nozzles, including the TurboDrop from Greenleaf Technologies, and the AI TeeJet from Spraying Systems.

Studies by the USDA-ARS at The Ohio State University compared these new nozzles with standard flat fan nozzles. Droplet size is reported as volume median diameter (VMD) and measured in microns (mm). The VMD is a relative indicator of droplet size where 50 percent of the spray volume is contained in droplets larger than the VMD, and 50 percent in smaller droplets. For comparison, a 100-mm droplet is about the same diameter as a human hair. Droplets less than 100-150 mm are highly susceptible to drift and should be avoided when applying herbicides near sensitive vegetation.

Both the TurboDrop and the Turbo TeeJet produced fewer drift-prone droplets than the extended range flat fan tip. Also, the percentage of spray volume in droplets less than 100 mm was much less with the TurboDrop and the Turbo TeeJet. These two measurements indicate that when used correctly, these nozzles can assist in reducing the amount of drift from a herbicide application.

It should be noted, though, that these tips are not recommended for all herbicide applications. Larger droplets do reduce coverage and the herbicide label should be consulted for any specific recommendations on nozzle type, operating pressure, application rate, and adjuvant use. An example would be the label for Liberty, which recommends a flat fan nozzle to maintain thorough coverage.

Remember, nozzle selection alone will not completely eliminate herbicide drift nor allow applications in extremely windy situations. Other strategies, such as reducing boom height, using larger nozzles, reducing pressure, and increasing the spray rate per acre should be used whenever possible to assist in drift reduction.

Table 1. Effects of nozzle type and pressure on droplet size.

	Pressure			
	40 psi		**60 psi**	
Nozzle type[1]	**VMD, µm**	**% Volume <100 µm**	**VMD, µm**	**% Volume <100 µm**
XR11002	142	25	129	32
XR11004	166	20	156	26
TT02	181	15	160	21
TT04	258	8	182	15
TD02	473	2	400	4
TD04	444	3	376	5

[1]XR, extended range flat fan; TT,Turbo TeeJet®; TD, TurboDrop®

Source: Derksen et al. USDA-ARS, 1997.

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