Plain Talk

K-STATE Research and Extension "Knowledge for Life"

**News from the Extension Biological and Agricultural Engineering at Kansas State University**
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## Nozzle Type Effect On Soybean Canopy Penetration

*By: Bob Wolf, Extension Application Technology Engineer*

Results from K-State laboratory experiments and field trials on growing soybean plants indicate that single nozzle designs offer better lower canopy penetration than double nozzle orifice configurations and that using venture or air injection nozzles with higher pressure sprays did not result in better penetration of the lower canopy.

The experiments were designed to compare fungicide penetration across various spray nozzles to determine how to improve lower canopy penetration on growing soybeans to prevent or control disease outbreaks, such as Asian Soybean Rust. Getting spray droplets to penetrate beyond the upper canopy is an effective method for fighting fungal diseases to maintain a healthy growing crop.

The laboratory research involved constructing a spray track to simulate a ground sprayer and arranging potted soybean plants to simulate a field of drilled soybeans with a 90 percent canopy density. A total of 20 nozzle types were used in the laboratory trials to compare the lower canopy penetration of the nozzles at pre-determined flow rates and droplet sizes. No significant differences were reported in the top 15 nozzles with the top four treatments being single nozzle configurations. The TT1106 sprayed at 50 PSI had the most coverage in the lower canopy. The field trials used 12 different nozzle types in drilled soybean plots with an estimated canopy of 75 percent. Again, the single nozzle configurations had more coverage in the lower parts of the canopy with the TT11005 sprayed at 75 PSI measuring the most.

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## Study Evaluates Effect of Nozzle Type, Pressure On Postemergence Weed Control

*By Bob Wolf, Extension Application Technology Engineer*
A recent study evaluating herbicide effectiveness by comparing various spray nozzles and application pressures reveals significant differences among nozzle and pressure treatments. The study also found few differences between herbicides and nozzle types. The results indicate that applicators should have specific knowledge about the control chemical, weed specie, nozzle, application pressure parameters, and the interactions between herbicides and weeds to achieve maximum treatment effectiveness.

The study compared five different spray nozzles – the chamber style turbo flat fan from Spraying Systems (TT), the venturi-style AirMix from Greenleaf (AM), the venturi-style Ultra LoDrift from Hypro (ULD), a turbo-venturi combination the turbo flat-fan induction from Spraying Systems (TTI), and the VariTarget from Delavan Ag Spray (VT). The VT nozzle is a new design for making variable rate applications. Two herbicides (paraquat and glysophate) were applied using high and low pressure sprays (70 and 40 PSI) on six species of plants (large crabgrass, ivy leaf morning glory, velvet leaf, sorghum, corn, and common sunflower).

Significant differences were found among differing nozzle and pressure treatments. In many of the comparisons, lower pressures actually tended to out perform higher pressure treatments.

Regardless of the nozzle and pressure selected, weed control between glyphosate and paraquat varied only as would be expected. Glyphosate provided better control of corn, sorghum, and large crabgrass than paraquat and was poor for ivy leaf morning glory to slightly less than paraquat for sunflower control. Paraquat had significantly better control of velvet leaf.

Using low pressure glyphosate spray, the AM, TTI, and ULD nozzles performed better than the TT and the VT nozzles for sorghum control. Using paraquat, the TT and AM at low pressure provided better velvetleaf control than the TTI, VT, or ULD nozzles. Using high pressure, the AM, TT, and ULD nozzles all performed better than the VT and TTI nozzles. Treatments for the study were replicated three times and efficacy was evaluated 28 days after treatment.

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## Building, Facility Plans Available At NDSU Web Site

Looking for building or facility plans? The North Dakota State University Extension Ag and Biosystems Engineering Department hosts a web site with access to building and facilities plans. The URL is www.ag.ndsu.nodak.edu/abeng/plans/index.htm. Categories include beef, dairy, machinery, horse, poultry, sheep, swine, crops and more. The plans provide conceptual information and should be reviewed by a professional before proceeding with a project. The site also contains links to the Midwest Plan Service and Canada Plan Service for your convenience.

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## Free Well Plugging DVD Available

*By: Judy Willingham, KELP Coordinator*
A useful DVD on plugging water wells is the result of a recent Applied Leadership Project (ALP) from the Kansas Environmental Leadership Program (KELP) Class 7. The team wanted a user-friendly informational piece that could be used to help landowners understand why and how

abandoned wells should be plugged. Working with a KSRE multi-media specialist, the KELP team updated an older well plugging video and converted it to DVD. Copies were distributed to each county Extension Office and all Watershed Specialists. In addition, the Wichita Realtor Association received several copies for their use. Additional DVDs are available from Kelly Dixon at (316) 660-1840; (316) 383-7951 or by email kdixon@sedgwick.gov. These DVDs can be copied and distributed as needed. The perfect written publication to use with the video is *Plugging Abandoned Wells, MF935*, available from your county Extension office or on the web at http://www.oznet.ksu.edu/library/h20ql2/mf935.pdf. Another source of information (also produced by a KELP team) is http://www.kswaterwell.org, with testing information for well owners, such as: Who to contact, how to sample, and general information about contaminants.

KELP team members were: Tonya Browleewe, Sedgwick Co.Extension; Kelly Dixon, Sedgwick Co. Code Enforcement; Peggy Holloway, Reno Co. H.D.; Andy Megrail, Sedgwick Co. Conservation District; Shanon Phillips, Oklahoma Conservation Commission; and Sam Sanders, Reno Co. agricultural producer. Funds for these projects were provided in part by the Kansas Water Plan Fund. KELP is funded in part by the U.S. Environmental Protection Agency.

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## Is Water From Private Wells Safe To Drink?

*By Morgan Powell, Extension Water Quality Engineer*

Landowners and renters who live out of reach of a public water supply have no good alternative but to rely on their own private supply. This is not new; it has been going on since Kansas was settled. However, perhaps the prevalence of water contamination is new. Persons with a public water supply depend on the utility for safe drinking water, and usually it is safe. Conversely, people who have a private water system must take responsibility for the safety of their own water. Past water surveys show that only about 40 percent of private wells reliably supply safe drinking water. Sanitarians and Extension Agents can be a big help with private water systems.

For nearly 10 years, K-State Research and Extension has emphasized that SAFE DRINKING WATER is supplied by a SAFE WELL. A safe well depends on meeting these reasonable straight forward minimum conditions:

- Well location: upslope and away from contamination sources
- Well construction: meets the current KDHE minimum standards
- Annual maintenance: well is checked for deficiencies, the well and water system are cleaned by shock chlorination, and finally, a confirming water tested is done
- Managed protection area: a plan is followed to protect well from becoming contaminated

When any of these four critical conditions is missing, an increased risk of well contamination and unsafe water is the result. Never attempt to rely on testing alone to assure safe water. Tests are recommended following well maintenance to confirm that things are okay.

Three K-State Research and Extension publications: *Private Wells – Safe Location and Construction*, MF-970; *Private Well Maintenance and Protection*, MF-2396; and *Shock Chlorination for Private Water Systems*, MF-911 explain how to meet these conditions. A fourth publication addresses testing: *Testing to Help Ensure Safe Drinking Water*, MF-951. This publication summarizes important information about water testing and includes a list of

laboratories in Kansas and neighboring states certified for drinking water. A Feb. 2007 update of this publication is on the KSRE web site: http://www.oznet.ksu.edu/library/h20ql2/MF951.pdf

Quarterly, following the months that lab certifications expire, Kansas Department of Health and Environment (KDHE) revises the list of laboratories. The list is posted on KDHE's web site at http://www.kdheks.gov/envlab/disclaimer.html. Look for drinking water certification. This list tends to change slowly, mainly with certification renewal. Occasionally a lab does not renew their certification and sometimes a new lab is added. Ideally, this publication on the K-State Research and Extension web site should updated after each KDHE revision. Realistically, sometimes there are other priorities. Although there are other labs that can test drinking water; without third party certification or oversight, accuracy of testing is difficult to document.

Other sources of helpful private well information are:

- K-State Research and Extension water well site: http://www.kswaterwell.org
- Texas rural well protection (Tex*A*Syst): http://waterhome.brc.tamus.edu/index.html

If you have question or comments to help improve private wells so the owners and users can have safe water, please let us know by phone or email, 1-785-532-5813, mpowell@ksu.edu

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## BAE Program and Computer Software Web Sites

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|---|---|
| **Website:** | **Biological & Agricultural Engineering** |
| URL Address: | http://www.bae.ksu.edu |
| Contact Person: | Gary Clark, Department Head |
| Brief Description: | Agricultural Engineering |
| Target Audience: | General |

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| **Website:** | **Precision Agriculture Web Site** |
| URL Address: | www.oznet.ksu.edu/precisionag/ |
| Brief Description: | Precision Agriculture |

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| **Website:** | **Kansas Environmental Leadership Program** |
| URL Address: | http://www.oznet.ksu.edu/kelp |
| Contact Persons: | Judy Willingham, Morgan Powell |
| Brief Description: | Kansas Environmental Leadership Program |
| Target Audience: | Kansas citizens, local government, agricultural and environmental groups, state agencies. |

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| **Website:** | **Kansas AgrAbility Project** |
| URL address: | http://www.oznet.ksu.edu/agrability |
| Contact Persons: | John Slocombe, Kerri Ebert |
| Brief Description: | Kansas AgrAbility Project |
| Target Audience: | General |

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| **Website:** | **Agricultural Safety and Health Program** |
| URL Address: | http://www.oznet.ksu.edu/agsafety |
| Contact Persons: | John Slocombe, Kerri Ebert |
| Brief Description: | Farm safety information |

Target Audience: General

**Website:** **Kansas Livestock Environmental Stewardship**
URL Address: http://www.oznet.ksu.edu/kles
Contact Person: Joe Harner
Brief Description: Livestock Environmental Stewardship
Target Audience: Kansas Livestock Producers

**Website:** **Mobile Irrigation Lab**
URL address: http://www.oznet.ksu.edu/mil
Contact Person: Danny Rogers
Brief Description: Mobile Irrigation Lab information
Target Audience: General

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