Application checkpoints for fall ammonia

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Abstract
Depending on postharvest field conditions, some producers will soon be considering anhydrous ammonia application. Using fall labor to apply fertilizer can be attractive but needs to be balanced with the potential for nutrient loss. To avoid conversion of anhydrous ammonia from ammonium to more leachable forms of nitrogen, application should be delayed until average soil temperature is below 50°F and trending lower. Measure the 4-inch soil temperature at near 10 a.m. or 7 p.m. or check Iowa State University's county soil temperatures and forecast.

Keywords
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Disciplines
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Safety is an important consideration whenever working with anhydrous ammonia. Long sleeves and pants, lined rubber gloves, and unvented goggles should be standard protective gear. A 5-gallon water supply should be readily available along with a 6-ounce plastic squeeze bottle carried on the operator. Use a safety chain and locking hitch pin when transporting ammonia. For more information see PM 1518d, Play It Safe with Anhydrous Ammonia [2]

When transferring ammonia, all hose connections should be first tightened then bleeder valves closed before opening any valves. When filling, valves should be opened beginning at the furthest downstream and working upstream. When disconnecting hoses, reverse this order by first closing the upstream valve and then all successive downstream valves. Open bleeder valves in the same order before disconnecting the line. Stay upwind when working with hose connections.

Ammonia should be injected below the crop seed zone to reduce the potential of seedling injury and deeply enough to avoid vapor losses. A white trail of water vapor or ammonia odor indicates deeper placement or better sealing is needed.

Because anhydrous ammonia converts to a mixture of liquid and gas as it moves through the applicator, even distribution can be a problem. To help application be more uniform, equipment should be properly maintained and adjusted. The screen and manifold should be free of rust flakes or other obstructions. The manifold should be mounted level on the toolbar. Hoses from the manifold to the knives should be the same length and diameter. Hoses to knives near the manifold may need to be coiled. If so, use horizontal coils held in place by ties or other means so that liquid is not allowed to rest in the bottom of vertical coils.

Research at Iowa State University indicates that ammonia liquid and gas are unevenly distributed inside the manifold. Think of the manifold as a clock face when looking down on it. Consider the direction of ammonia flow into the manifold (before any redirection by a 90° turn into the entry) as pointing toward 12 o'clock. Outlet ports in the region across from this incoming flow, in the 10 o'clock to 2 o'clock positions, tend to have high output rates. Outlet
ports in the region immediately behind the entry, in the 4 o'clock to 8 o'clock positions, tend to have intermediate output rates. Ports midway, on either side of the manifold (from 2 o'clock to 4 o'clock and from 8 o'clock to 10 o'clock) tend to receive lower flow rates. To obtain more uniform distribution across the application swath, hoses from adjacent applicator shanks should be connected to different regions around the manifold outlet ring to avoid having two high or two low output knives adjacent to each other. See PM 1875, Improving the Uniformity of Anhydrous Ammonia Application [3] for more details. Adjust the regulator setting if tank pressure varies through the day. A heat-exchanger flow controller can be used instead of a regulator to improve rate control of total flow through the applicator.

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