

## Nitrogen Fertilization considerations for an Unusually Wet Fall: Challenges and Opportunities

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With this fall's unusually large amounts of rain and snow, most farmers in Manitoba are struggling with several difficult decisions. Front and centre is the delayed harvest of many crops, especially soybean and corn crops. But for some farmers, their traditional fall nitrogen fertility program is also in jeopardy.

Recent surveys show that Manitoba farmers use many options for applying nitrogen and phosphorus fertilizers. But fall band application of nitrogen (N) is still the primary practice for 45% of wheat acres, 34% of canola acres and 32% of corn acres (Table 1). This wet fall has put this practice into jeopardy.

Table 1. Nitrogen fertilizer placement and timing used by Manitoba farmers for spring wheat, canola, soybeans and corn (based on % of acres or volume applied).

Practice	Wheat	Canola	Soybeans	Grain corn
	% of acres or volume applied			
<b>TIMING</b>				
<b>Fall</b>	<b>45</b>	<b>34</b>	<b>1</b>	<b>32</b>
Spring, preplant	11	13	0	48
At seeding	43	51	4	23
Post seeding, in crop	2	2	1	22
<b>PLACEMENT</b>				
Broadcast , no incorporation	0	2	0	11
Broadcast and incorporated	4	13	0	35
<b>Preplant banded</b>	<b>52</b>	<b>40</b>	<b>0</b>	<b>39</b>
Sidebanded	12	12	2	13
Mid row banded	17	19	1	3
Seed placed	13	11	1	2
In crop applied	2	2	1	22

Source: STRATUS Ag Research Surveys (2016-2018).

Agronomists and farmers are generally preoccupied with soil temperatures in the fall and their effect on nitrogen conversion and losses. Cold soils are known to slow the conversion of stable ammonia-form N to nitrate-N, which is vulnerable to loss. So growers are encouraged to delay fall band applications until soils have cooled to 10°C or less. Soils have certainly cooled to this target range, but of course the wetness is the real problem, making it difficult to apply fertilizer or to avoid substantial losses of N.

Wet soils hinder our ability to physically apply N, particularly banded ammonia. Poor soil tillage reduces slot sealing and wet soil provides poor trafficability and increases compaction and rutting.

And wet soils also reduce N efficiency through greater losses, particularly for surface broadcast fertilizers. These greater losses occur not only during the fall, but also in spring, because a wet fall often leads to a wet spring, with a high probability of poor infiltration of snowmelt, leading to overland **runoff** and ponding. Surface applied nutrients (e.g., broadcast fertilizer) are vulnerable to such runoff loss already since many soils are so saturated that additional moisture is moving as run-off rather than infiltrating. Furthermore, broadcast N converts quicker to nitrate than banded N, increasing the risk of **leaching** on coarse-textured (sandy) soils and **denitrification** on poorly drained, fine-textured (clay) soils.

Fortunately, there are numerous timing and placement options other than fall broadcast or banded N to meet N needs of the crop, as shown in Table 1. For example, if corn and soybean fields become badly rutted during harvest, some spring tillage will be required, which provides the opportunity for some preplant banding or incorporation of broadcast N.

In addition, combinations of new sources and new application technology give farmers more options than ever for spring and midseason applications of N, for example:

- fertilizer sources such as ESN, which has a polymer coating for reducing toxicity of seed-row placed urea applied at planting
- SuperU and other enhanced efficiency fertilizers and/or additives that reduce the risk of gaseous losses due to volatilization of surface applied urea or UAN solutions
- Fertilizer application technology such as high clearance sprayers that can apply 28-0-0 in dribble or directed bands in established crops. We now have data that demonstrate that midseason applications of N can be very effective in high yielding spring wheat and corn, for example

So, if wet soils continue to thwart banding anhydrous ammonia this fall, farmers still have lots of options for applying N next spring and summer. And, if you still want to purchase fertilizer this fall, to take advantage of seasonal price discounts, go ahead ... but put it in the bin or the tank, not broadcast in the field.

Details on risks of N losses and spring N options are summarized by Dr. C Grant and posted at [http://www.umanitoba.ca/faculties/afs/MAC\\_proceedings/proceedings/2004/grant\\_spring\\_options.pdf](http://www.umanitoba.ca/faculties/afs/MAC_proceedings/proceedings/2004/grant_spring_options.pdf)