Fertilizer nitrogen applications in hot, dry weather conditions

Current hot, dry conditions are not appropriate for most fertilizer operations for obvious reasons. But in some cases applications are necessary and care should be taken.

1) Surface applied nitrogen fertilizer will be stranded at the soil surface and unavailable to the plant until rainfall is received to take into the root zone.

2) Surface applied urea or urea-based fertilizers like UAN solution (28-0-0) are vulnerable to very high volatilization losses under such conditions (Table 1). A urease inhibitor, like Agrotain containing NBPT, is recommended to minimize losses. But some soil moisture at the surface is required to initiate the hydrolysis reaction leading to volatilization. Current dry soils are likely to simply strand N at the surface until substantial rainfall is received. Between ¼" to 4/10" rain is required to incorporate surface N so volatilization losses are minimized.

Table 1. Loss of applied urea and UAN in 7 days as influenced by temperature and N source (Grant et al, AAFC, Brandon)

Weather conditions	Check	Urea	Urea & Agrotain	UAN	UAN & Agrotain
	% of applied N volatilized				
May (warm 20-25 C)	0	40	2	7	1
July (hot 30 C)	0.6	88	12	50	16

3) Surface applied UAN as a spray or dribble are likely to cause severe leaf burning under current temperatures (Figure 1-2). If you choose to apply, minimize leaf contact by directing fertilizer between rows.

Figure 1-2. UAN leaf burn with broadcast UAN (left) and dribble banded (right) in corn.

Some crops will be nearing the stage for their split application of N – for example spring wheat and corn.

Split N in spring wheat – if growers withheld some of their total N requirements of their wheat crop, the window for yield-building applications is between stem elongation and emergence of the flag leaf (Figure 3). Yield and protein response by wheat has been very good in MB studies, WHEN AT LEAST 1/5" RAIN WAS RECEIVED WITHIN 5 DAYS. So within this window of application, growers may wish to wait until rainfall is most likely.

Figure 3. In-season application stages for nitrogen: stem elongation (T1) and flag leaf emergence (T2).

Now that much corn has emerged and has 3-4 leaves, side dressing with N will proceed. Ensure NH_3 or UAN solution is placed deep enough in the trench to prevent losses. High volatilization losses have been

measured when UAN was applied shallow in unsealed slots. Row closing disks may be beneficial to prevent losses and leaf injury from fugitive NH_3 (Figure 4-5).

Figure 4-5. Ammonia slot sealing with closing disks (left) and leaf injury from unsealed slots (right).

Following some of these simple and obvious approaches should help protect your nitrogen and your crops until favourable moisture conditions return.

More details at:

Split N in wheat: https://gov.mb.ca/agriculture/crops/seasonal-reports/pubs/nitrogen-splits-for-wheat.pdf

Side dressing corn: https://gov.mb.ca/agriculture/crops/seasonal-reports/pubs/nitrogen-timing-for-corn.pdf