

## Fertiliser calibration: the principles webinar

### Questions and Answers

Answers provided by Ian Richards and Nigel Simpson. Webinar recording available at:

<https://youtu.be/ZWsaJH0pY18>.

#### FERTILISER

- Can you give some examples of good vs poor particle strength? A crush strength of at least 2 kg for compounds (preferably nearer 3) but lower for prilled N. See <https://www.yara.co.uk/crop-nutrition/fertiliser-handling-and-safety2/physical-properties-of-fertilisers/> and <https://www.yara.co.uk/crop-nutrition/agronomy-advice/heavier-fertiliser-spreads-further/>
- Can you comment on losses to atmosphere of nitrogen to atmosphere when using standard 34.5% AN, why do we use it but most of the world use urea? Losses from AN can occur on calcareous soils but are small. Defra project NT26 reported field trials in which average losses of 17% and 25% for urea N applied to tillage crops and grassland respectively but 1-2% for AN. We use AN largely for historical reasons but also for efficiency of N supply on application. The work is published in Defra Research Report NT2605 - see [http://randd.defra.gov.uk/Document.aspx?Document=NT2605\\_4075\\_EXE.doc](http://randd.defra.gov.uk/Document.aspx?Document=NT2605_4075_EXE.doc).

#### SPREADER CALIBRATION

- Ian, are your spreader testing results collecting testing for liquid fertiliser? The implication from the survey was not enough testing of spreading, but liquid fert applicators i.e sprayers are NROSO tested? The British Survey of Fertiliser Practice question does not distinguish between liquids and solid fertilizers but the way results are expressed indicates the question referred to solid fertilizers. I'll check this. Certainly regular NSTS tests for sprayers are helpful.
- Does the lack of looking at tables lead to the conclusion that too much inorganic fertiliser is applied? Could be too much or too little. Either way, there is scope for improved utilization of manure and inorganic nutrients. If too much fertiliser or manure is applied according to crop need at the time this not only causes pollution of air and water, but loses farmers money, and we want to avoid any losses from this or where nutrient supply is not in balance with need. Inappropriate rate and timing is also a breach of the Farming Rules for Water – please see <https://www.nutrientmanagement.org/latest-information/news/new-farming-rules-for-water-hub/> and <https://www.gov.uk/government/news/new-farming-rules-for-water>
- Why do you think that farmers are resistant to calibrating manure and fertiliser spreaders, is it cost or trust in accuracy? Ian: I think cost and possibly inconvenience but I have no evidence to confirm that. Nigel: To address the need for both the benefits and costs of not regularly calibrating fertiliser and manure spreaders is why we're are running these webinars which we hope will help people think this is essential.

#### LIQUID NITROGEN



- Surely liquid N is far more accurate? Can be, especially at field boundaries. **Care is still needed to check application rate and evenness of spread along the boom.**
- We are 50% liquid N fert users, any comments? **Choice of solids v liquids v mix of the two is mainly down to practicalities on the farm. Both solids and liquids can be spread accurately provided sufficient care is taken, and machines are regularly calibrated. Sprayers can leak and have their own issues, not to mention tend to be relatively expensive to operate compared to a fertiliser spreader so the benefits come at a modest cost.**

## APPLICATION

- How successful is shallow injection in no-till land? **Answer covered during the webinar. Application by dribble bars are more usual and would avoid root severing; so we would only advise injection prior to no till drills rather than once crops established; but whatever method of liquid / slurry/ digestate application beware of localised issues close to seed, and risk of adverse effects.**
- What about poultry litter to standing crops? **Answer covered during the webinar.**
- When considering direct drilling, what would count as incorporation of manures. **Exemptions available for no-till on incorporation in Clean Air Strategy**
- Alkaline soils result in higher volatilisation losses. Should we stay away from Urea and UAN on these soils? If so, what would you say the cut off PH is to avoid? 7+? I don't think there is a cut-off pH. **In my experience, soil texture and Cation Exchange Capacity are as, or more, important than pH in affecting ammonia emission. Heavier soils with high CEC tend to have low losses.**
- After spreading FYM/digestate etc is there a preferred way or technique to incorporate or just a shallow cultivator such as Karat/springtine etc? **The main thing is to prevent contact between the manure or digestate and the air. Any technique that covers the manure should be effective.**
- With the higher use of slot/direct drills where farmers don't want to move soils e.g. blackgrass issues, is there any advice on application of solid manure? **If there is a place in the rotation where the soil is incorporated, that is where manure should be applied (if possible).**

## PRECISION TECHNOLOGY

- Ian, have you had any experience with variable rate nitrogen applications in winter wheat using biomass satellite imagery? **No personal experience of satellite imagery used this way. There will be the usual issues of coverage (clouds etc). Biomass is used in tractor mounted sensors but usually in conjunction with spectral reflectance. It seems to provide improved adjustment of fertiliser rates to match crop and soil needs.**

## NUTRIENT TESTING

- Any thoughts on the best kit for on farm N testing of slurry or dirty water? **Agros Meter is the one usually used. The Quantofix Volumeter is another, and is better than not knowing the nitrogen content of slurries above 5% N. Or Tramsread <http://www.tramsread.co.uk/monitoring/slurry-test-kits> sell slurry test kits**
- What on farm nutrient testing kits would you recommend for organic manures? **For slurry, there is the Agros / Quantofix Meters. The John Deere HarvestLab NIR sensor can be used as a stationary item but I suspect cost would be a factor. Alternatively use an-off farm lab.**

## CROP SPECIFIC QUESTIONS



- How would you go about managing Nitrogen loss when organic materials are applied to standing crops/grass? *Answer covered during the webinar. Do not over apply according to crop needs, temperature – too high for volatilisation or low for crop uptake, windy conditions or where there is a risk of pollution of water from crack flow, run-off down tramlines or over frosty ground/ snow – please follow Nitrate Vulnerable Zone and Farming Rules for Water rules.*
- I assume that the 12hr incorporation rules for arable land include maize stubbles if so what are we seeing around the country? *The British Survey of Fertiliser Practice records this. Latest data indicate 60% poultry manure, 50% FYM and 35% cattle slurry incorporated within 24 hours. Corresponding values within 6 hours are 22%, 8% and 5% but these are very variable from year to year.*
- A bit leftfield but advice welcome, with very few seedbeds rolled this autumn and next spring I am switching to liquid fert on a lot of land. Do I dare roll land to be treated with liquid fert (or roll land after application) and what gap to avoid damage to crop, in both situations....!! Given of course the harshness of liquid compared to solid N. *Answer covered during the webinar. Please roll any cereal before GS30 to avoid damage, but not when frosty, and please allow a 2 weeks interval from pesticide or liquid fertiliser applications.*

## FUTURE POLICY

- What is going to be the "best practice" technology for incorporation of slurries in growing arable crops? *Answer covered during the webinar.*
- Ian, do you believe the potential ban on urea-based fertilisers will aid the accuracy of spreading of nitrogen fertilizer? *Let's see if there is a ban first! Urea can be spread accurately with care and under the right conditions (lighter particles can be susceptible to side winds but there is the greater risk of ammonia loss from urea versus Ammonium Nitrate; although losses can be reduced by inhibitors).*
- Should Red Tractor make tray testing part of their standard and not just rate calibration? *I think anything that promotes the value of tray testing is helpful, and there are economic benefits from doing this.*
- Does Ian feel that there is a need for more operator training and if so what application method / type of nutrient application needs the training *Greater and wider knowledge of the nutrient values of manures and care in their use and timing would be top of my list. There's also the benefit of wider knowledge of the research – hence this webinar, and the next one planned on Feb 3 2021.*
- Do you see any further regulation on the horizon with more concern with climate change, carbon foot-printing, water quality? *Slurry application method and slurry store covers look like being early hits. There is a recognized need to reduce GHG and ammonia emissions from agriculture and this is where I'd expect regulations to develop.*
- Do the panel believe all watercourses will have to have a grass margin in future? *Key words are 'all' and 'have to'. I'd expect grass margins to be promoted but not necessarily by regulation. However, I don't have any inside track on this. There are benefits to grass or other buffer strips and as such variable widths to suit the situation can help improve workrates, reduce losses to water and in terms of NVZ rules / Farming Rules for Water the 2metre rule for fertiliser plus the 10 metre no-spread zone for organic manures & slurries do provides a "buffer" – but such are not always sufficient if you look at assessing the risks – which is part of Farming Rules for Water.*