

Liquid nitrogen fertilisers as carriers for post herbicide and fungicide applications

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KEY MESSAGES

Liquid nitrogenous fertilisers (LNF) potentially offer growers more application flexibility over traditional granular types as they can be applied through a boom-spray or injected into the soil with seeding equipment. Past research has shown that LNFs are agronomically effective as granular sources. However, LNF's potentially offer growers an opportunity to co-mix with pre and post-emergent chemicals. Co-mixing is a potential advantage to growers as it reduces the application of herbicide and fertiliser to one pass, thus reducing the costs associated with an application. Past laboratory testing has identified physical compatibility of many pesticides with LNF's, however there has been little field data which shows biological compatibility. The data from this research indicates LNF's that are applied with pesticide formulations, which contain solvents such as xylene, as well as adjuvants such as wetting agents and crop oils, potentially create unacceptable crop damage. Further research is required to evaluate the efficacy of these co-mixes on weeds.

AIMS

MAXamFLO (UAS) is a solution of urea and ammonium sulphate containing 22.5% nitrogen and 6.5% sulphur (w/w). UAN is a solution of urea and ammonium nitrate containing 32% nitrogen (w/w). The aim of the research is to evaluate the crop phytotoxicity of common broadacre chemicals and their corresponding adjuvants when combined with water, MAXamFLO or UAN. A large field trial was conducted to assess the phytotoxicity of these combinations on eight common Western Australian wheat varieties. The aims of this experiment were;

- (i) To compare the crop phytotoxicity of MAXamFLO and UAN when combined with common broadacre chemicals
- (ii) To compare the crop phytotoxicity of chemical and fertiliser mixes between wheat cultivars.

METHOD

A three factor factorial experiment (wheat cultivar, herbicide and fertiliser source) was setup. Eight wheat cultivars, *Stilleto*, *Carnamah*, *Calingiri*, *Westonia*, *Camm*, *Saphire*, *Ruby* and *Wyalkatchem* were each sown at 75 kg per hectare with 100kg/ha MAPSZC® and top-dressed with 200kg Urea. Eight post application herbicides were mixed with water, MAXamFLO or UAN and applied at 50 litres per hectare at the 5-6 wheat leaf stage (Z1.5-1.6). Herbicide treatments included 1.5L/ha Nugrass (375g/L), 1.5L/ha Nugrass (375g/L) + 0.25% (v/v) Chemwet (1000g/L), 750ml/ha Nugrex (276g/L), 1.5L/ha Nugrass (375g/L) + 750ml/ha Nugrex (276g/L), 5g/ha Associate (600g/kg), 5g/ha Associate (600g/kg) + 0.25% (v/v) Chemwet (1000g/L), 380g/ha Achieve (400g/kg) + 1% (v/v) Supercharge (432g/L), 250ml/ha Impact (250g/L) and 250ml/ha Bumper (250g/L). All treatments were applied with a ute boom with Teejet type SS11001 jets at a constant water volume of 50L/ha. The trial included 4 replicates and was randomised. Plots were 2.2m x 6.5m long and were sown with a Harrington point system at 22.5cm row spacings.

Visual assessments (% crop phyto) of the treatments were conducted at 7 days after application (7DAA) and again at 14 days after application (14DAA).

RESULTS

Emulsifiable concentrate formulations and herbicides requiring the addition of wetting agents mixed with either UAN or MAXamFLO, caused greatest crop damage across all wheat varieties compared to water (Figures 1-6). Crop phytotoxicity (%) was significantly (LSD = 5%) greater when UAN was used as a carrier compared to MAXamFLO or water across all herbicide and fungicide treatments. At 50L/ha application rate, UAN supplied 6kg/ha more nitrogen than MAXamFLO, but no sulphur.

Significant (LSD = 5%) differences in crop phyto (%) were observed between wheat varieties when UAN or MAXamFLO were used as carriers compared to water (Figures 1-6). The significant (LSD = 5%) damage generated to the wheat varieties by mixing these common chemicals with either UAN or MAXamFLO indicates that growers should exercise caution when co-mixing liquid fertilizers with chemicals.

CONCLUSION

Liquid nitrogenous fertilizers (LNF) potentially offer growers greater application efficiencies. However, combining LNF's with broadacre herbicides and fungicides can cause unacceptable crop damage. Chemicals which are formulated as emulsifiable concentrates or which require an adjuvant are particularly damaging to growing crops. Further research is required to assess the efficacy of these co-mixes on weed control.

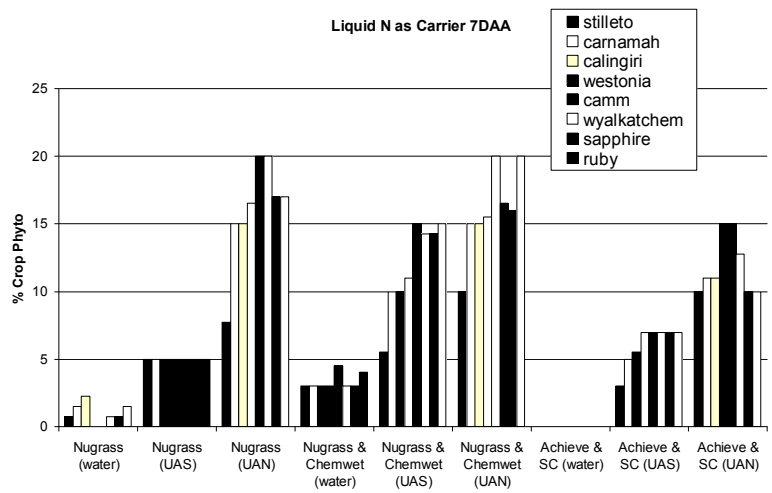


Figure 1. Crop Phytotoxicity (%) rating of common grass selective herbicides applied with water, MAXamFLO (UAS) or UAN onto 8 wheat cultivars, 7 days after application (7DAA) (LSD 5% = 0.8)

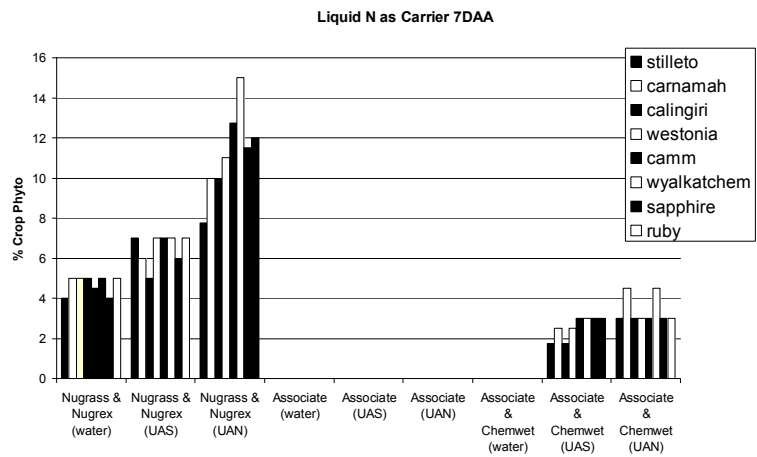


Figure 2. Crop Phytotoxicity (%) rating of common broad leaf and grass selective herbicides applied with water, MAXamFLO (UAS) or UAN onto 8 wheat cultivars, 7 days after application (7DAA) (LSD 5% = 0.8)

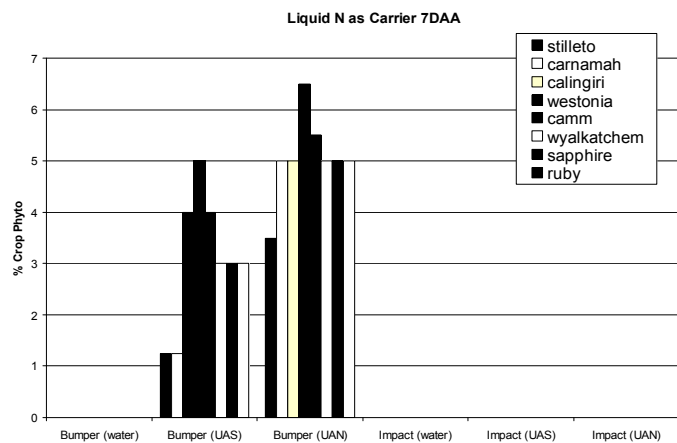


Figure 3. Crop Phytotoxicity (%) rating of common fungicides applied with water, MAXamFLO (UAS) or UAN onto 8 wheat cultivars, 7 days after application (7DAA) (LSD 5% = 0.8)

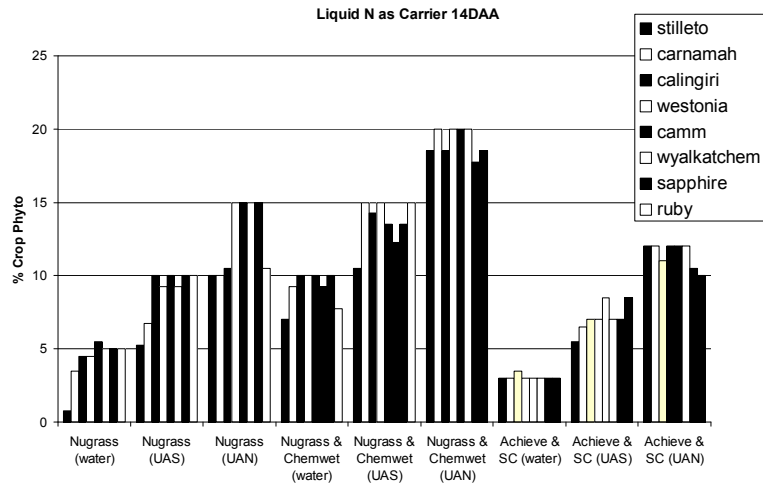


Figure 4 Crop Phyto (%) rating of common grass selective herbicides applied with water, MAXamFLO (UAS) or UAN onto 8 wheat cultivars, 7 days after application (14DAA) (LSD 5% = 1)

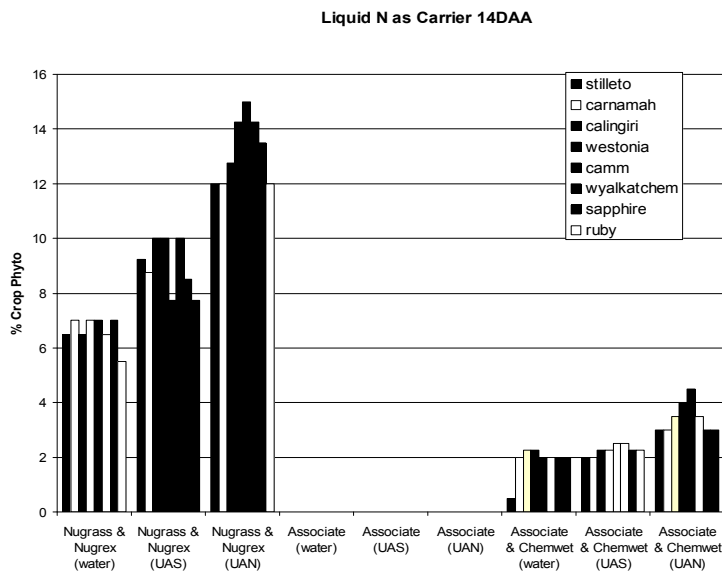


Figure 5. Crop Phyto (%) rating of common broadleaf grass selective herbicides applied with water, MAXamFLO (UAS) or UAN onto 8 wheat cultivars, 14 days after application (14DAA) (LSD 5% = 1)

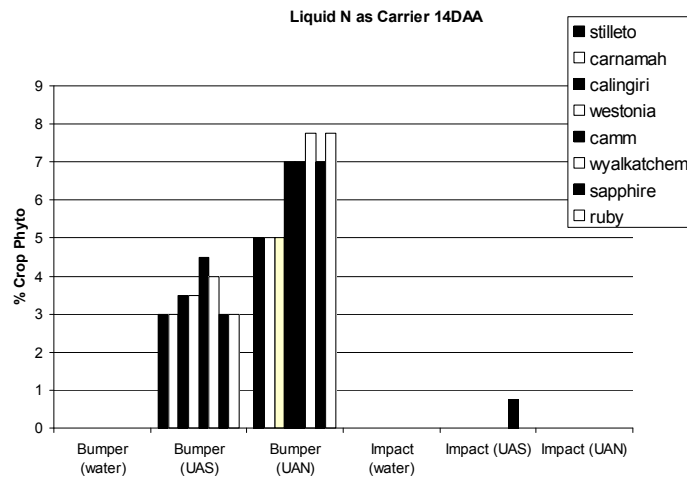


Figure 6. Crop Phyto (%) rating of common fungicides applied with water, MAXamFLO (UAS) or UAN onto 8 wheat cultivars, 14 days after application (14DAA) (LSD 5% = 1)