

Grass Height Affects Emission of Ammonia from Applied Broiler Manure

Ammonia volatilization is a major loss pathway for N from land applied manure.

Strategies for reduction of ammonia loss generally involve injection or incorporation of manure. Both approaches are challenging for application of solid manure on perennial forages, notwithstanding the new broiler manure injectors that have been recently proposed (Pote et al. 2011).

Previous work has shown lower ammonia emission when liquid pig manure was applied in bands under a growing crop of winter wheat (Sommer et al. 1997). This potential abatement method has not been examined for solid manures. Solid cattle manure is likely to flatten standing grass but poultry litter is less clumped so will tend to fall through the canopy. We conducted a study to assess the effect of grass height on mitigating ammonia loss from applied broiler litter.

We applied raw broiler litter from a commercial farm on an established orchardgrass (*Dactylis glomerata* L.) sward with heights set by trimming at 25, 75, 175 and 275 mm (1, 3, 7 and 11 in) (Fig. 1). The litter was applied at 470 kg N/ha or 100 kg ammonium-N/ha (420 lb/ac or 90 lb ammonium-N/ac).

Ammonia measurements were made using 0.5 x 2 m (1.5 x 6 ft) wind tunnels with continuous air flow averaging 1 m/sec (3 ft/sec) as measured with vane and hot wire anemometers (Fig. 2). We sampled over 14 days by trapping ammonia from the wind tunnels in phosphoric acid.

For all grass heights, more than half the emissions occurred in the first 24 hours after manure application (Fig. 3). This shows the importance of rapid incorporation of

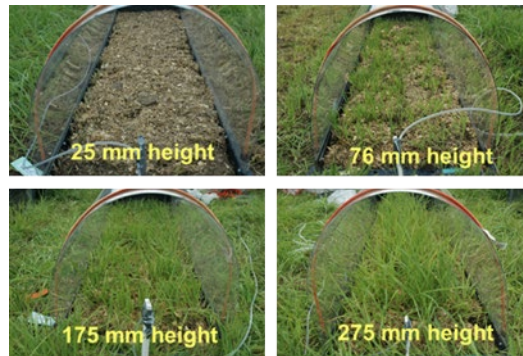


Figure 1. Grass height (mm) in tunnels after litter application (for inches multiply by 0.039).

the 25, 100, 175 and 275 mm (1, 3, 7 and 11 in) heights, respectively; emissions from 275 mm (11 in) grass were significantly lower (30%) than the shortest grass height.

Our reductions were lower than those reported by Sommer et al. (1997) for liquid hog manure. The reasons for less effect of canopy height in our study may have been the high wind velocity in the tunnels combined with lower sward density. Applying manure under a crop canopy may have additional benefits of reducing odour and runoff and increasing rate of nutrient uptake (unpublished data). The technique may be improved by investigating the effect of canopy structure, manure types and weather conditions.

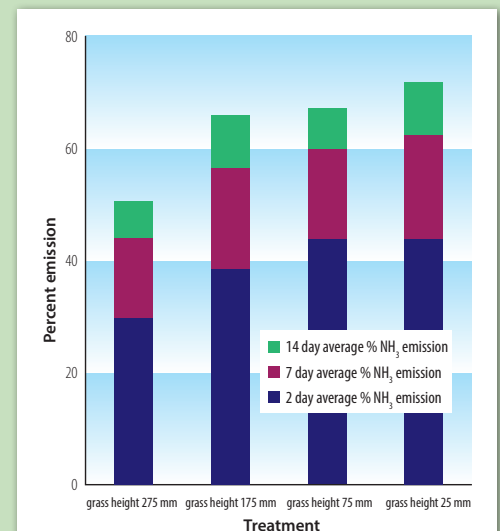


Figure 3. Fraction of initial ammonia-N emitted over a period of 2, 7 and 14 days.



Figure 2. Experimental setup for studying ammonia emission with wind tunnels.

References available online at www.farmwest.com

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