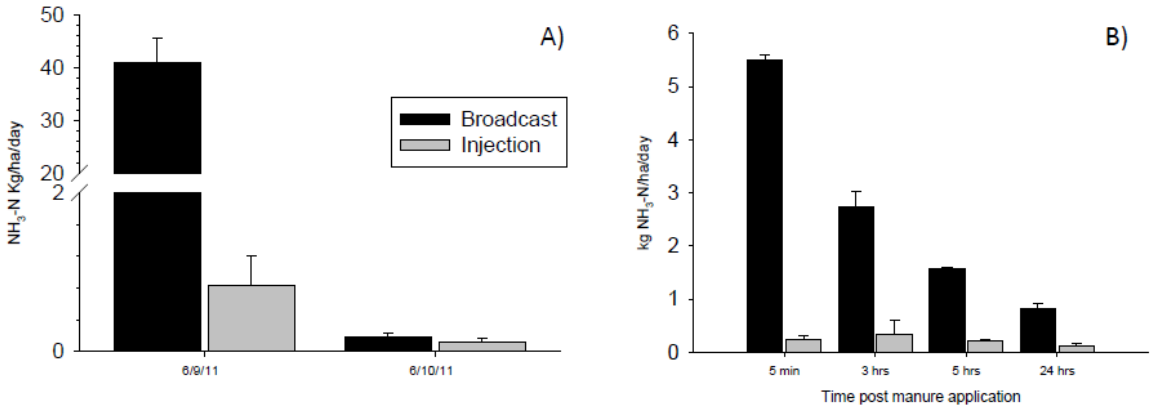

Fig. 3. Ammonia volatilization losses in kg-N-ha^{-1}-day^{-1} from A) the first manure application date on June 6, 2011, and the day after manure application on June 10, 2011and from B) the second manure application event on the lysimeter plots- May 18, 2012. Measurements were taken five minutes, three hours five hours and 24 hours after manure application. Error bars indicate standard error.

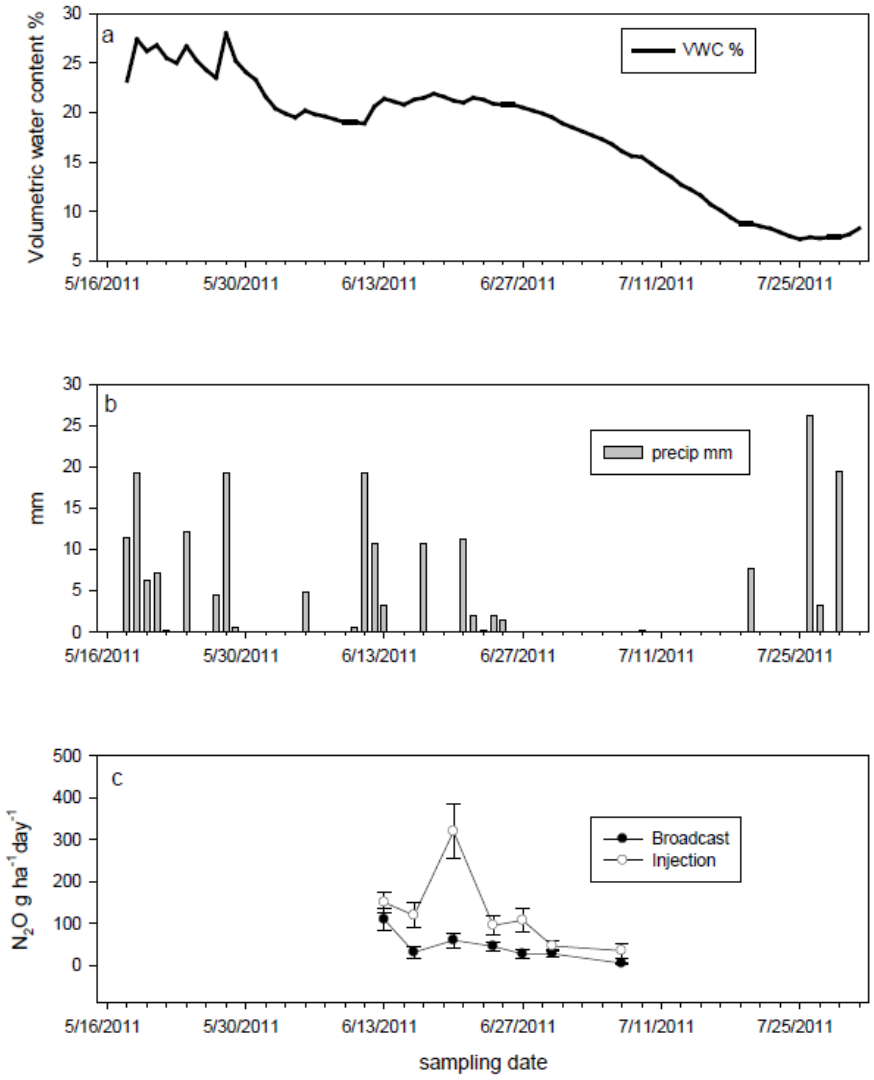

Fig. 4. A) Daily average of the soil moisture (volumetric water content in percent) for the lysimeter plots at a depth of 20 cm from May 19 to July 30, 2011. B) Daily average of precipitation (mm) at the site for the same dates. C) Average N_2O emissions from June 13 to July 7, 2011.

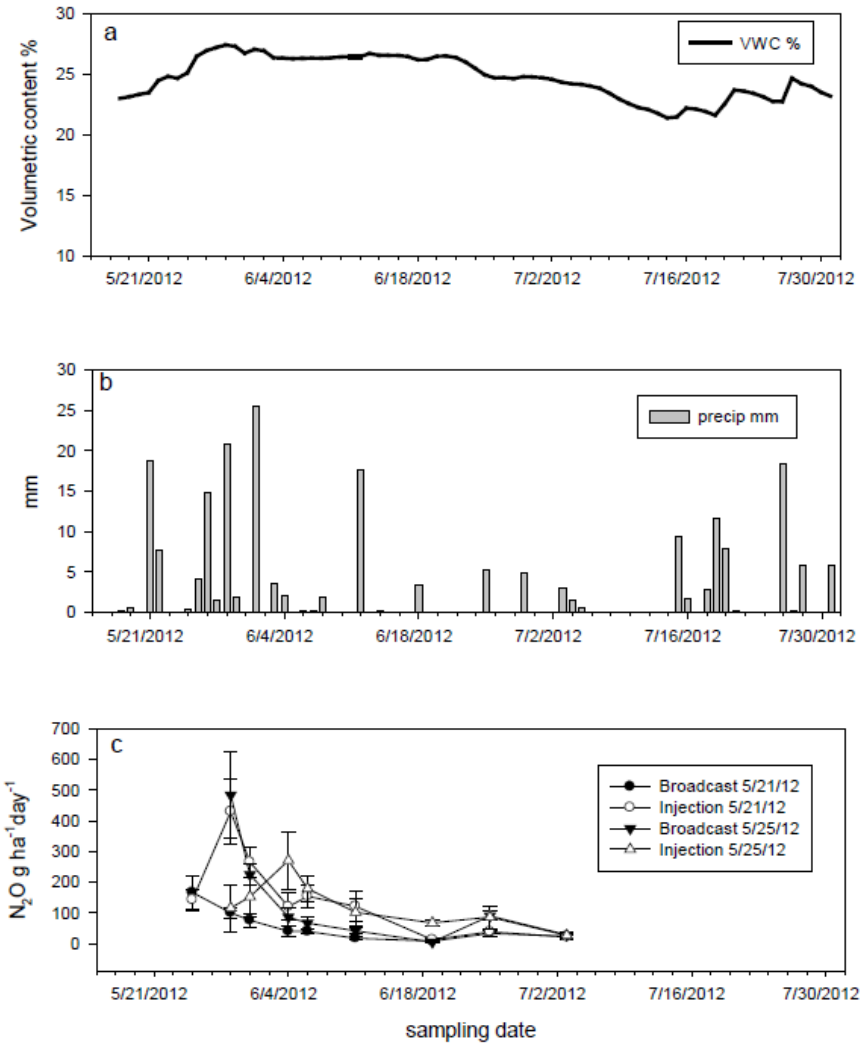

Fig. 5. A) Daily average of the soil moisture (volumetric water content in percent) for the lysimeter plots at a depth of 20 cm from May 18 to July 30, 2012. B) Daily average of precipitation (mm) at the site for the same dates. C) Average N_2O emissions from May 25 to July 3, 2012. The dates in the legend are the date of manure application. Manure application was split in the spring of 2012 due to weather conditions.

Table 6. Cumulative N_2O emissions for one month periods following dairy manure applications in 2011 and 2012. Values in parentheses are the standard error (n=8 for June 9, 2011 and May 21, 2012 application dates and n=4 for the May 24, 2012 applications). Means for broadcast application and injection on the same application date are not significantly different (P≤0.05) when accompanied by the same letter.

Application Date	Broadcast	Inject
	kg N_2O ha^{-1}	
June 9, 2011	1.4 (0.4) a	3.1 (0.4) b
May 21, 2012	1.95 (0.3) a	4.8 (0.8) b
May 24, 2012	3.9 (0.4) a	4.2 (0.8) a

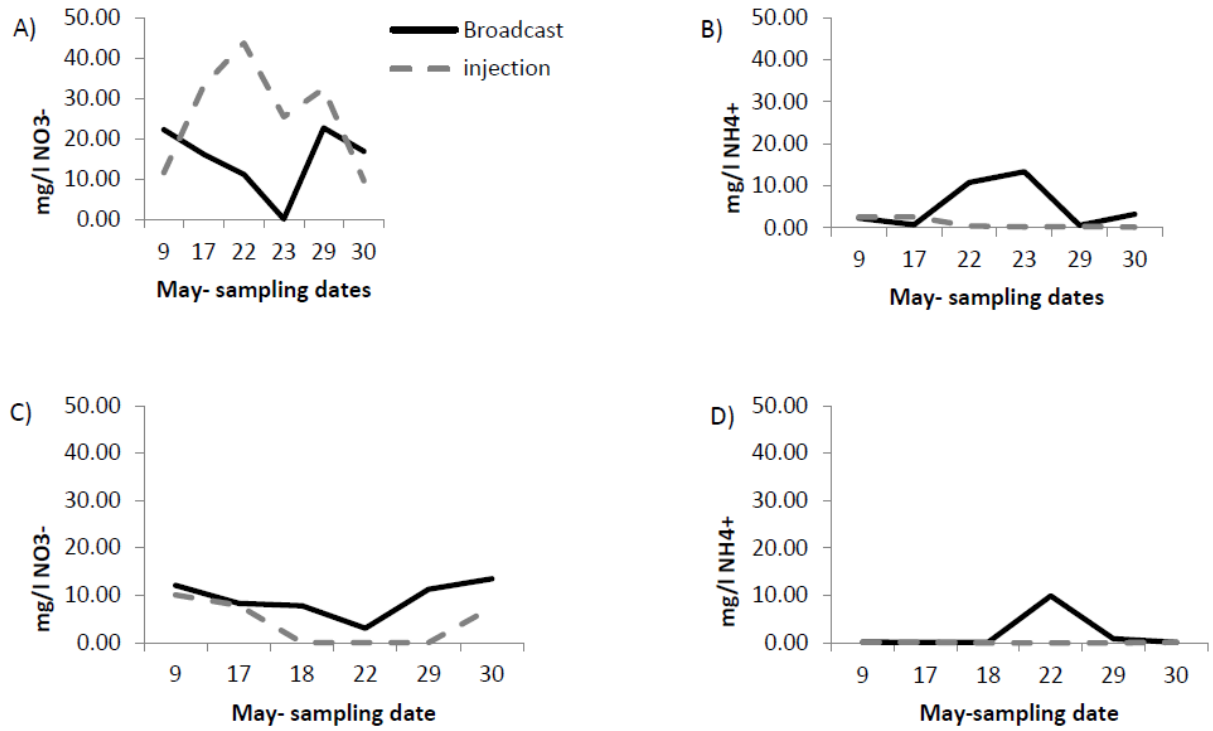

Fig. 6. Surface runoff water A) nitrate and B) ammonium concentrations and subsurface water C) nitrate and D) ammonium concentrations from broadcast and shallow disk injection manure treatments, May 2012.

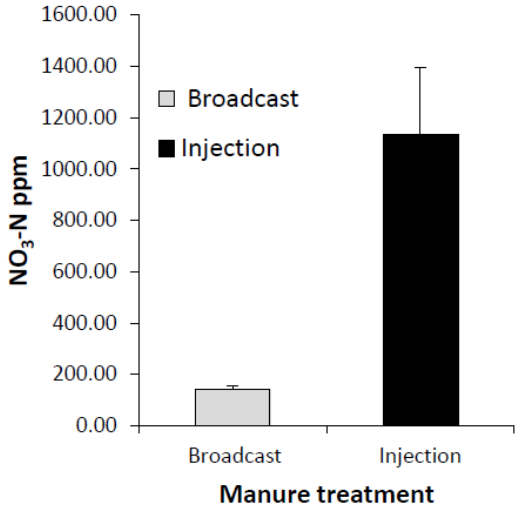

Fig. 7. Late season corn stalk nitrate averages in ppm for corn silage planted in May of 2012. The error bars represent standard errors of the average concentrations for each treatment.