

Visions for a Sustainable Planet

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AMMONIA VOLATILIZATION FOLLOWING SURFACE APPLICATION OF NITROGEN FERTILIZERS TO CORN IN NO TILAGE

¹Letícia de Abreu Faria; ²Carlos Antonio Costa do Nascimento; ³Godofredo Cesar Vitt; ²Elaine M. S. Guedes; ²Edson P. da Mota; ²Diego W. do Vale; ⁴Pedro Henrique de Cerqueira Luz;

1. Student scholarship PhD FAPESP at ESALQ/USP (lefaria@usp.br); 2. PhD student at ESALQ/USP; 3. Prof. Dr. ESALQ/USP; Av. Pádua Dias, 11, CP 9, CEP 13418-900, Piracicaba-SP-Brasil; 4. Pos doctoral student at ESALQ/USP; 5. Prof. Dr. FZEA/USP, Av. Duque de Caxias, 254, Pirassununga-SP.

- Brazil → urea is the most used source of N in agriculture;
- Technologies + urea → reduce volatilization in no tillage



Figure 1. Evaluation of ammonia volatilization from fertilizers through semi-open collector in dynamic form.

Experiment:

- Randomized complete block (4 replications);
- No tillage;
- 100 kg ha⁻¹ of N applied in surface application in 2010 under corn residue and in 2011 under soybean residue.
- N sources: urea (U), urea + 15% (m/m) zeolite (UZ), ammonium nitrate (AN), urea coated with boric acid and copper sulfate (UC), mixes of ammonium sulfate (33.3%) + urea (66.7%) (AS+U) and ammonium sulfate (33.3%) + urea coated (66.7%) (AS+UC) and a control (without N).
- Ammonia evaluation: 4, 8, 12, 16 and 20th day after fertilizers application

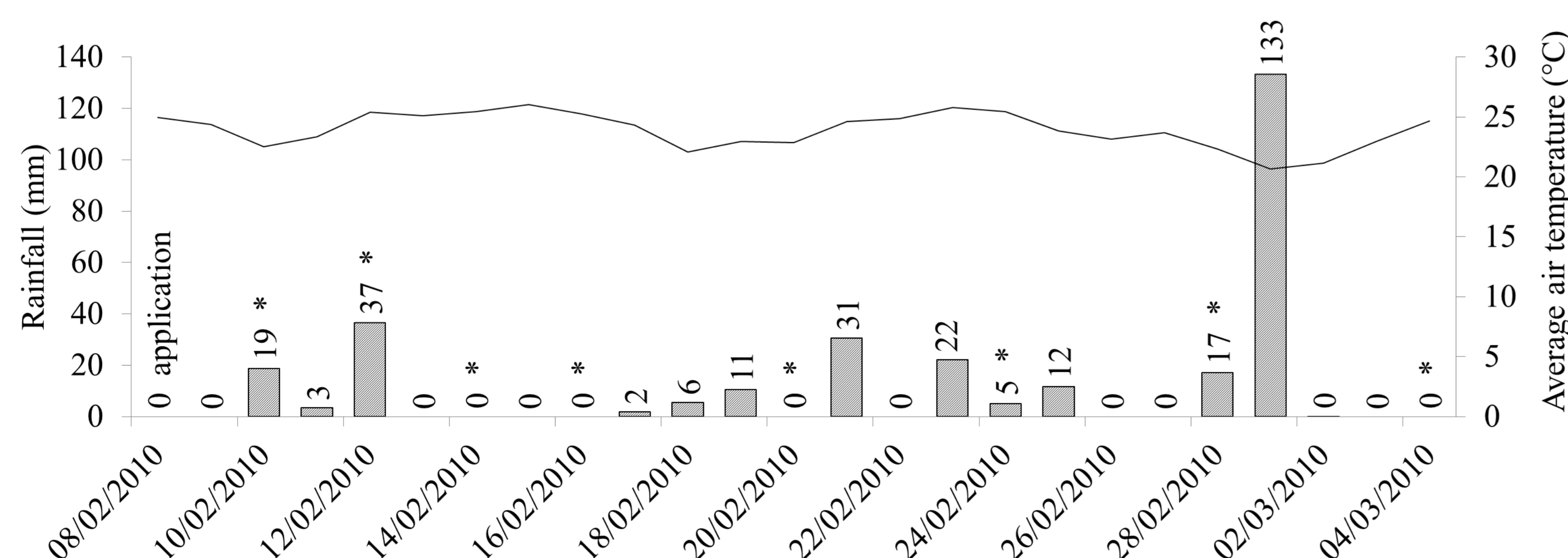


Figure 2. Local climate data 2009/10

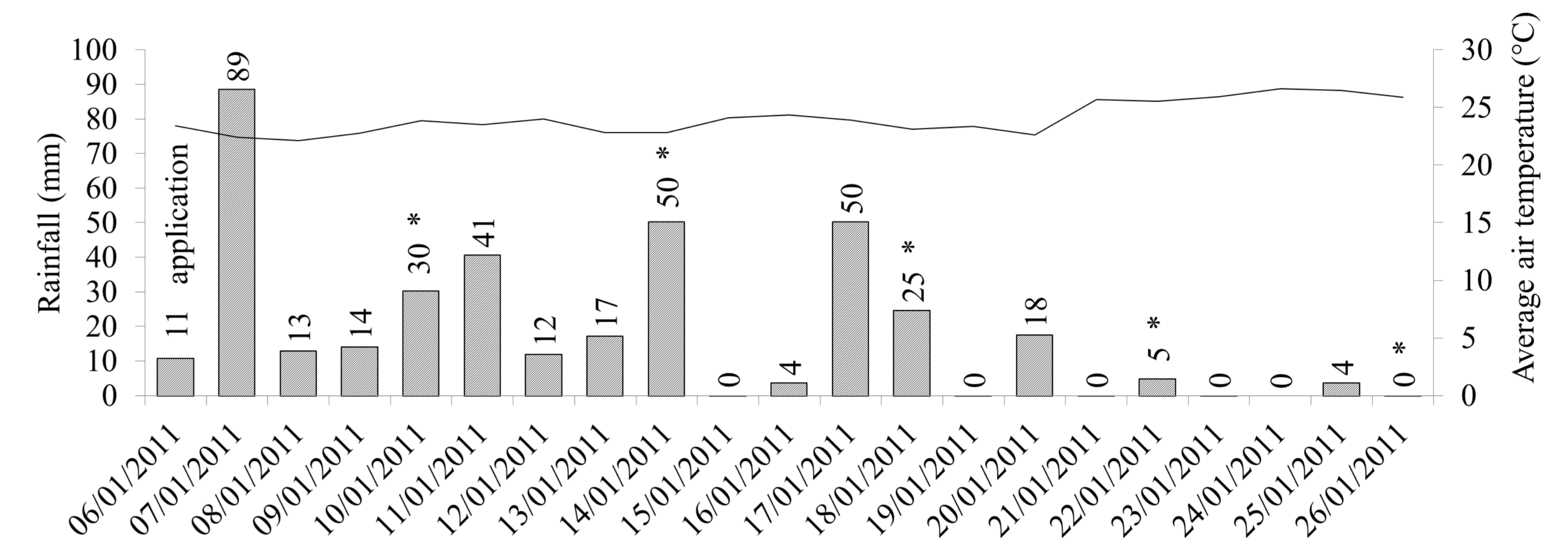


Figure 3. Local climate data 2010/11.

- NH₃-N volatilized → < 20% of total N applied

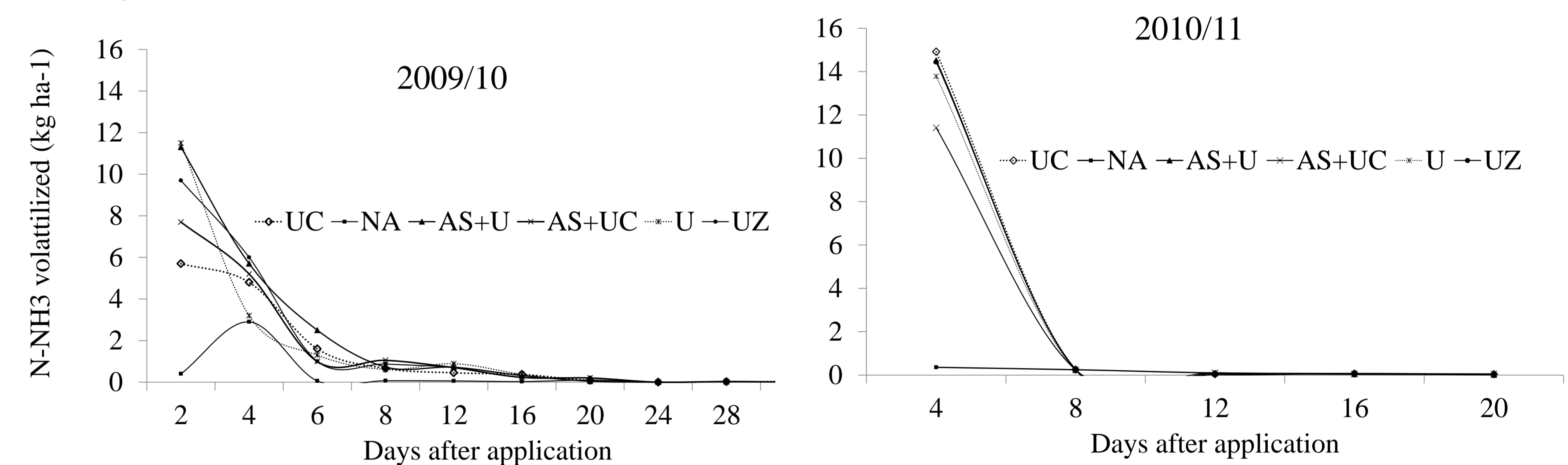


Figure 4. Loss of ammonia volatilization in 2009/10 and 2010/11.

Table 1. Orthogonal contrasts and significance of total N-NH₃ volatilized (kg ha⁻¹) in 2009/10 and 2010/11

Contrasts	N-NH ₃ Volatilization (kg ha ⁻¹)			
	2009/10	Test F	2010/11	Test F
Control vs UC + U + (AS+U) + (AS+UC) + UZ + AN
UC vs U + SAU + (AS+UC) + UZ	-7,9	**	1,8	ns
AS+U vs UC + U + (AS+UC) + UZ	1,7	ns	1,2	ns
AS+UC vs UC + U + (AS+U) + UZ	2,6	ns	-2,4	ns
U vs UC + (AS+U) + (AS+UC) + UZ	1,2	ns	0,1	ns
UZ vs UC + U + (AS+U) + (AS+UC)	2,4	ns	-0,7	ns

- Rainfall 2010/11 → No difference among urea treatments.
- In conclusion, urea coated with boric acid and copper sulfate showed lower peak of NH₃ volatilization among the treatments, with exception of ammonium nitrate in 2010.

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