Supporting information (SI)

$\boldsymbol{F_W}$, the denitrification response factor to soil WFPS, is defined as:

Eq. SI1

$$\text{If WFPS} < 0.62, \quad F_W = 0$$

$$\text{If WFPS} \geq 0.62, \quad F_W = \left(\frac{WFPS - 0.62}{0.38}\right)^{1.74}$$

$\boldsymbol{F_N}$ *t*he denitrification response factor to soil nitrate content [NO_3^-] (mg-N kg^{-1} soil) is defined as:

Eq. SI2

$$F_N = \frac{[NO_3^-]}{(K_m)_1 + [NO_3^-]}$$

Where [NO_3^-] is nitrate concentration (mg-N kg^{-1} soil) and $(K_m)_1$ = 22 (mg-N kg^{-1} soil) (Hénault and Germon, 2000).

$\boldsymbol{F_T}$ the denitrification response factor to soil temperature, corresponding to two different biological reaction rates: one for temperature (*t*) below and one for above 11 ℃, as follows:

Eq. SI5

$$F_T = exp\left[\frac{(t-11)ln(89) - \ln(2.1)}{10}\right], \quad t < 11℃$$

$$F_T = exp\left[\frac{(t-20) - \ln(2.1)}{10}\right], \quad t \geq 11℃$$

Table SI-1. Simulation results: Average ratios between ammonium (NH_4^+-N) and nitrate (NO_3^--N) concentrations (mgL^{-1}), nitrous oxide emissions (mg-N m^{-2} d^{-1}), and water-filled pore space (WFPS) at 10, 20, and 30 cm below chambers with a dripper at their bases (In) and under a standard representative dripper with no base (No).

Fertilizer	Depth	NH_4-N_{-In}/ NH_4-N_{-No}	NO_3-N_{-In}/ NO_3-N_{-No}	N_2O-N_{-In}/ N_2O-N_{-No}	$WFPS_{-In}$/ $WFPS_{-No}$
Yes	10cm	185±9%	97±4%	97±4%	100±0%
Yes	20cm	179±9%	100±4%	98±4%	100±0%
Yes	30cm	189±10%	101±4%	101±4%	102±0%
No	10cm	209±10%	81±5%	78±6%	99±0%
No	20cm	205±11%	84±6%	83±5%	98±0%
No	30cm	220±13%	84±6%	85±5%	99±0%
p^*	10cm	0.085	0.017	0.013	0.017
p^*	20cm	0.063	0.025	0.018	0.005
p^*	30cm	0.060	0.024	0.026	0.005

15 *represents the *p* value of the t-test between the In/No ratios at all the measuring days
16 with and without fertilizer application.
17
18 **Table SI-2.** Simulation results: Correlations between N_2O-N fluxes and ammonium-N
19 (NH_4^+-N) and nitrate-N (NO_3^--N) concentrations in the top soil (0 – 10cm) under
20 bases of variable sizes (i.e., no-base, 20, 30, and 40 cm internal diameter, ID) with a
21 dripper at their centers.

Base ID	N_2O-N/NO_3-N		N_2O-N/NH_4-N	
	R^2	*P*	R^2	*P*
No-base	0.996	>0.001	0.298	>0.001
20-cm	0.996	>0.001	0.001	0.796
30-cm	0.997	>0.001	0.006	0.527
40-cm	0.999	>0.001	0.111	0.004

22
23 **Table SI-3.** Simulation results: Correlations (R^2) between N_2O-N fluxes and the
24 water-filled pore-space (WFPS), ammonium-N (NH_4^+-N), and nitrate-N (NO_3^--N)
25 concentrations at depths of 10, 20 and 30 cm below the base of a static chamber, with
26 a dripper at its center (In), and under a dripper without a base (No).

	N_2O-N/WFPS		N_2O-N/NH_4-N		N_2O-N/NO_3-N	
	R^2	*p*	R^2	*p*	R^2	*p*
10cm-In	0.000	0.951	0.0001	0.944	0.972	0.000
20cm-In	0.001	0.845	0.0039	0.599	0.983	0.000
30cm-In	0.004	0.598	0.0117	0.363	0.996	0.000
10cm-No	0.093	0.009	0.2249	0.000	0.995	0.000
20cm-No	0.104	0.005	0.1884	0.000	0.993	0.000
30cm-No	0.117	0.003	0.1999	0.000	0.992	0.000

27
28
29

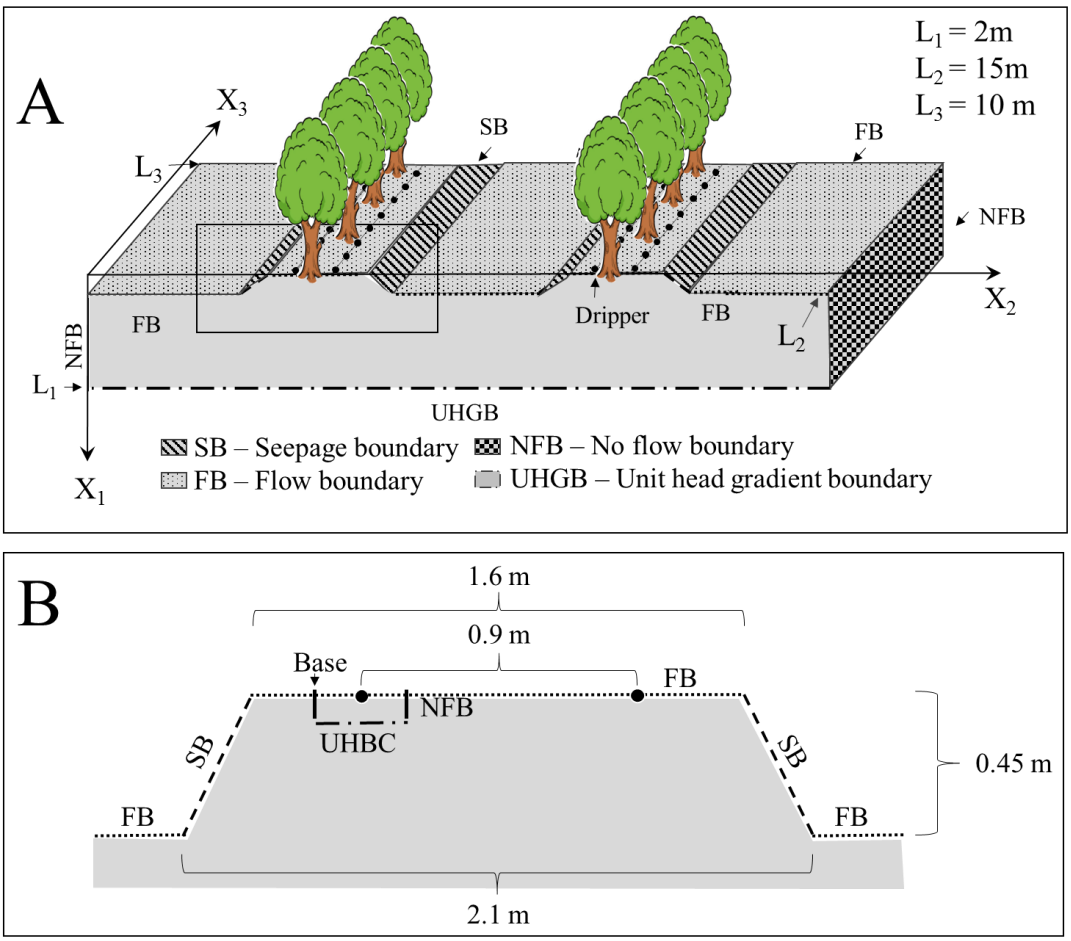

Fig. SI-1. (A) Schematic representation of the simulated subplot that includes two adjacent drip irrigated tree rows on ridges, located 6m apart, with four trees, located 3.5m apart, along each row. (B) Blowup of the ridge, and the boundry conditions used in the simulations. Boundry conditions are indicated by different border lines, acronames, and fillings.