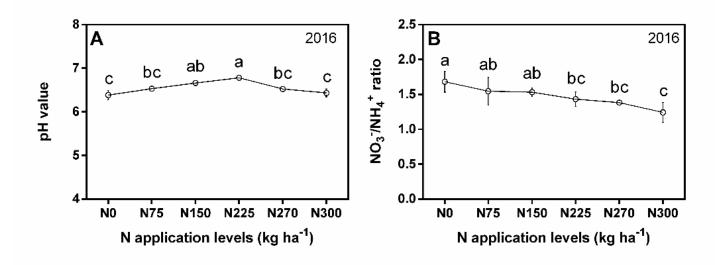
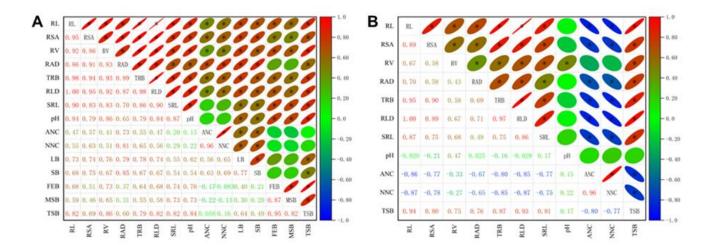


## **Appendix**



**Figure A1.** Comparisons of average soil pH value and  $NO_3^-/NH_4^+$  ratio in the shoot in two consecutive years under different N application levels. A = soil pH value in 2016. B = soil  $NO_3^-/NH_4^+$  ratio in 2016. Different lowercase letters indicate a significant difference under 6 N application levels in the same year. Values = means  $\pm$  SE. These data are for maize and alfalfa after harvest.



**Figure A2.** Corelation coefficients among the root morphology indexes and shoot biomass (A: Maize in 2016; B: Aalfalfa in 2016). RL, root length; RSA, root surface area; RV, root volume; RAD, root average diameter; RLD, root length density; SRL, specific root length; ANC, ammonium nitrogen content; NNC, nitrate N concentration; LB, leaf biomass; SB, stem biomass; FEB, female ears biomass; MSB, maize seed biomass; TSB, total shoot biomass. \*Significant at P≤0.05.