Book of abstracts

Phosphorus in Soils and Plants Symposium

Towards a sustainable phosphorus utilization in agroecosystems

FACULTAD DE AGRONOMÍA

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abstracts

Theme 5 - Impact of phosphorus on environmental quality and on biodiversity
Poster Session

Phosphorus losses by surface runoff in two rice rotation systems

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Sustainability of water quality and quantity in Merín Lagoon (ML) basin has become an issue of concern, recognizing nutrient runoff from agricultural environment as one of the major sources influencing water impairment. The main area of rice cultivation in Uruguay is located in this watershed. We implemented a daily water balance method to evaluate the effect of land use intensity on surface runoff and phosphorus losses in two rice-based rotation systems that belong to a long-term experiment located in the ML basin. The experiment was carried out in 2020-2021 during the rice flooded period (125 days). Treatments were (a) rice-pasture (RP, rice-cover crop-rice followed by 3.5 yr of a perennial pasture, and (b) continuous rice (RR, rice-cover crop). Although both treatments required a similar irrigation volume (752 ± 96 mm), the estimated surface runoff for RR (237 ± 6 mm) was a little higher than for RP (205 ± 14 mm). The average total phosphorus (TP) concentration of the inflow water was 147 ± 59 µg L. TP contents of standing water in the paddy field peaked in the first six days of flooding and decreased over time. Concentrations were always higher for RR (350 - 6,500 µg L) than for RP (190 - 2,990 µg L). Results showed that the intensified rotation (RR) increased TP losses by 2.3 times compared with RP (1.4 and 0.6 kg ha^{-1}). A single event (pre-harvest drainage) accounted for 48% of the total export of TP due to high outflow volume. We concluded that the conversion of rice-pasture rotation to a more intensive rice production system increases the risk of P losses to surface waters. However, avoiding surface runoff at the beginning of the flood period and at pre-harvest drainage may reduce significantly P losses and their impacts on water quality from rice paddies.