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In a nutshell

Broiler litter contains ionophore antibiotics that may contaminate surface waters. Our research showed that aluminum sulfate (or alum) applied to broiler litter could reduce the concentration and total loads of these compounds in runoff. Alum was more effective in summer than in winter. In summer, simulated rainfall 4 weeks after litter application resulted in lower antibiotic concentrations and loads in runoff than rainfall immediately after litter application.



Materials and Methods



BL with alum (LA) (20% w/w) or without alum (L) was applied to grassed field plots (0.75 m x 2 m) at 5000 kg ha⁻¹.

Plots received simulated rainfall at 50 mm h⁻¹ once at 0, 2, or 4 weeks after BL application.



Runoff was collected for 30 min and samples were analyzed for ionophores.

Results No. 2

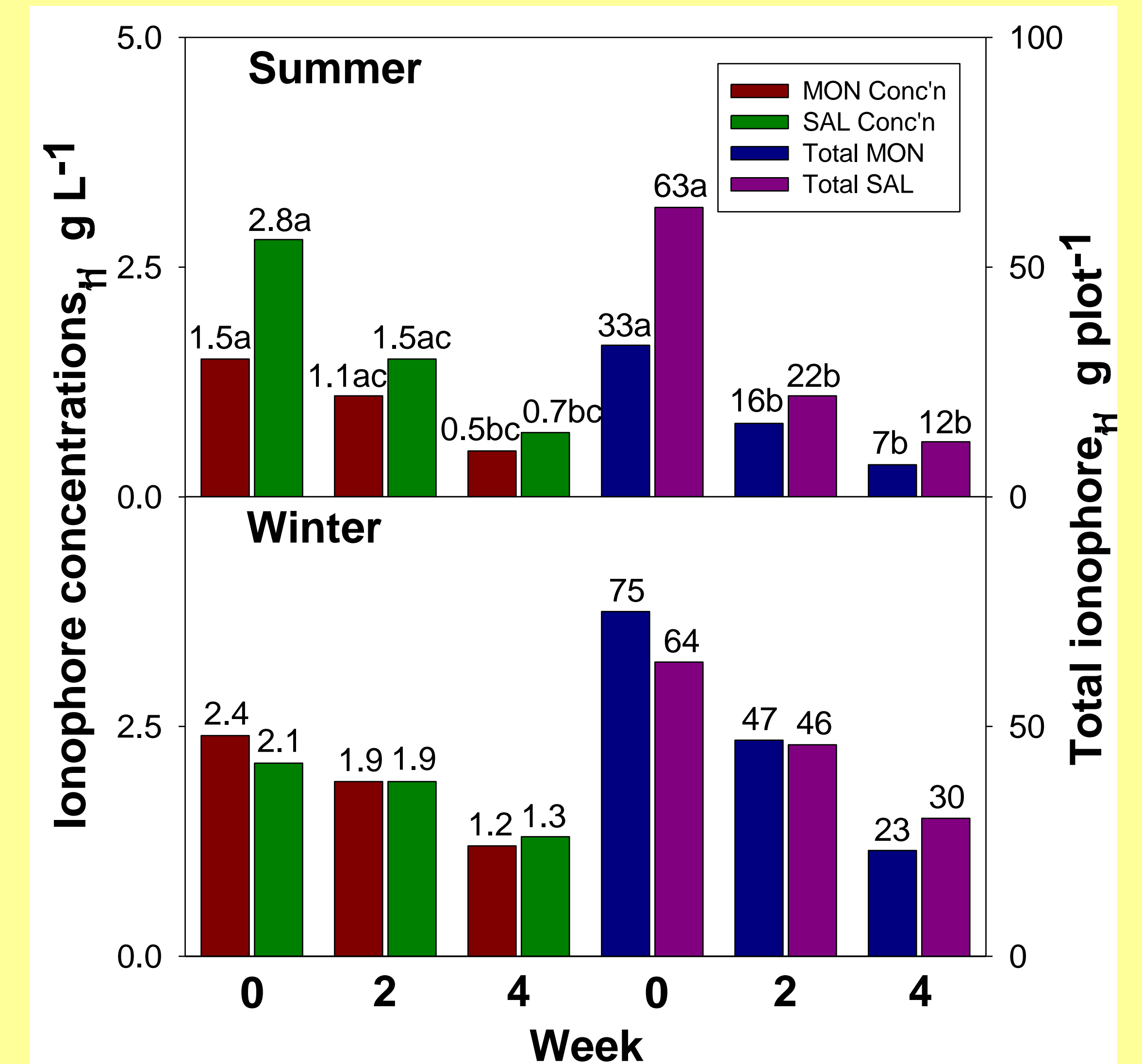
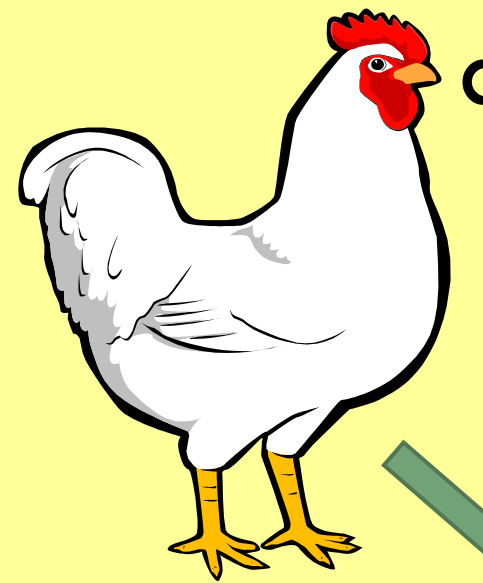


Fig 2. In summer, concentrations and loads of ionophores in runoff were smaller when simulated rain occurred at 2 or 4 weeks rather than immediately after BL application (p -values <0.05 ; means across alum treatments).

Background

Monensin (MON) & salinomycin (SAL) are ionophore antibiotics used to fight off coccidiosis in broilers.

These drugs have been detected in broiler litter, and natural waters¹⁻².



broiler litter



No study has yet been done on controlling the release of these compounds from broiler litter using a chemical amendment.

Research Questions

- Could alum reduce the movement of ionophores in runoff from surface-applied BL in pastures?
- Will alum be consistently effective in the summer and the winter seasons?
- Would longer times before applied BL receives rainfall decrease ionophore movement in runoff?

Results No. 1

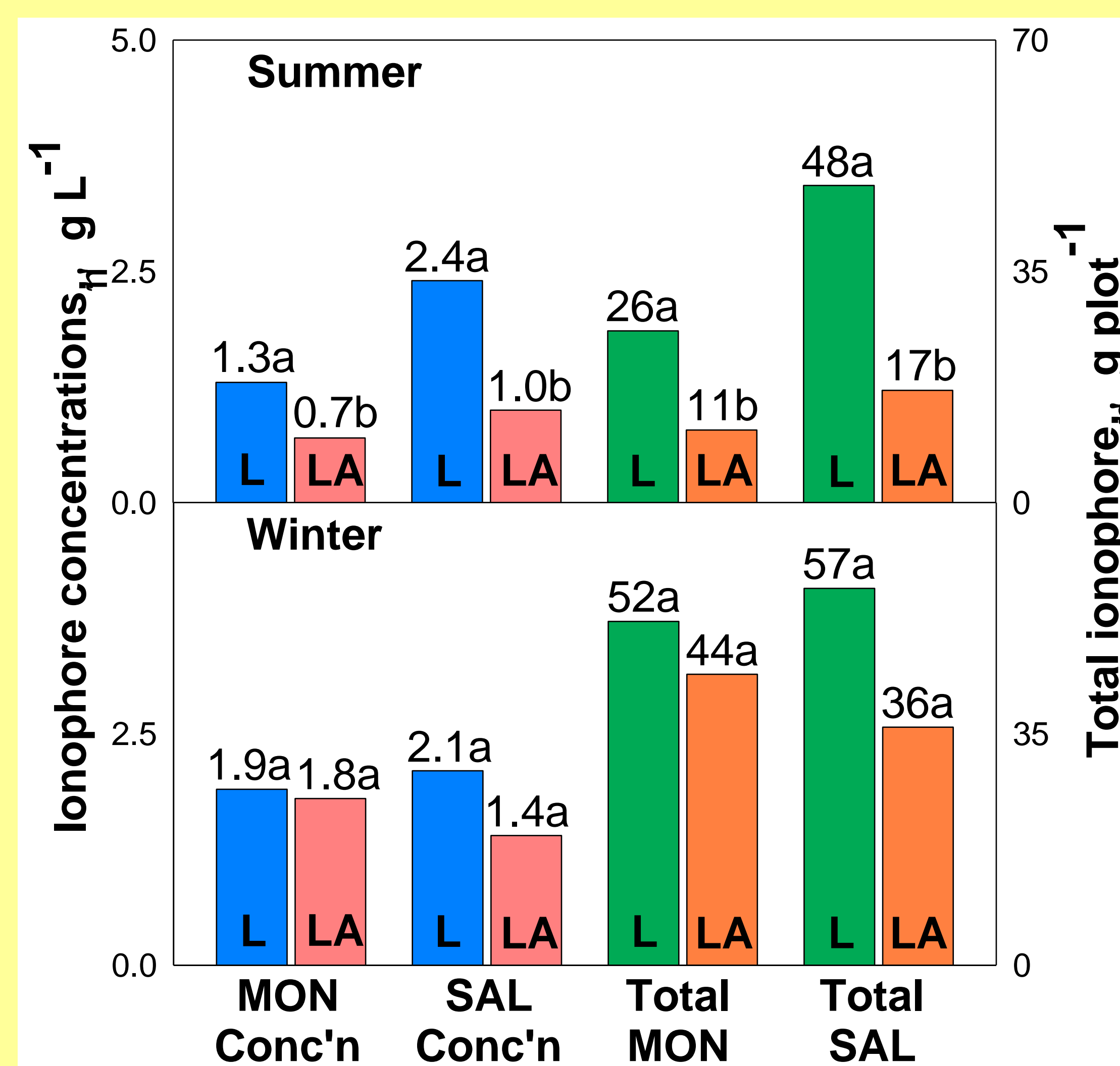


Fig 1. Alum reduced the summer concentrations and loads of monensin and salinomycin (p -values <0.03), winter concentrations and loads of salinomycin (p -values <0.15), but not winter concentrations and loads of monensin in runoff from surface-applied BL to grassed plots (means across rainfall treatments).

Conclusion

- Adding alum to BL at 20% (w/w) reduced the concentrations and loads of monensin and salinomycin in runoff in the summer, but had smaller or no effects in winter.
- Ionophore concentrations and amounts in runoff decreased when simulated rain was delayed to 2 or 4 weeks after BL application in the summer.

References

- ¹Sun et al., (in press). Detection and quantification of ionophore antibiotics in runoff, soil and poultry litter. J. Chrom. <http://dx.doi.org/10.1016/j.chroma.2013.08.044>.
- ²Kim, S.-C and K. Carlson. 2006. Occurrence of ionophore antibiotics in water and sediments of a mixed-landscape watershed. Water Res. 40:2549-2560.

Acknowledgement

This project was funded by USDA grant 2009-65102-05843.