

Narrow Grass Hedge Effects on Nutrient Transport

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Production agriculture contributed \$9.5 billion to Nebraska's economy in 2002.



Nebraska's livestock industry accounts for more than 65% of the state's total agriculture receipts each year.



Annual animal manure production
in Nebraska is 27 million tons.



Research Goal

Develop cropping and management practices that incorporate the use of manure as a valuable nutrient source and soil amendment without causing adverse environmental impacts.



Conservation Practices



Hypothesis

- Stiff-stemmed grass hedges, planted at selected down slope intervals, can significantly reduce the transport of nutrients in runoff from areas with a range of soil nutrient values.

Objectives

- Determine the effects of grass hedge and compost application rate on runoff nutrient load.
- Compare the effects of grass hedge, compost application rate, and inflow rate on nutrient transport rate in runoff.

Experimental Procedures

- The investigation was conducted near Lincoln, Nebraska.
- Composted beef cattle manure was applied at five rates to a silty clay loam soil and then incorporated by disking.
- Soil samples were collected 242 days later.

Experimental Procedures

- A 1.4 m wide switch grass hedge had been established at the site.
- Experimental plots were 0.75 m wide by 4 m long.
- The grass hedge was located at the down slope portion of 15 of the 30 plots.











Experimental Procedures

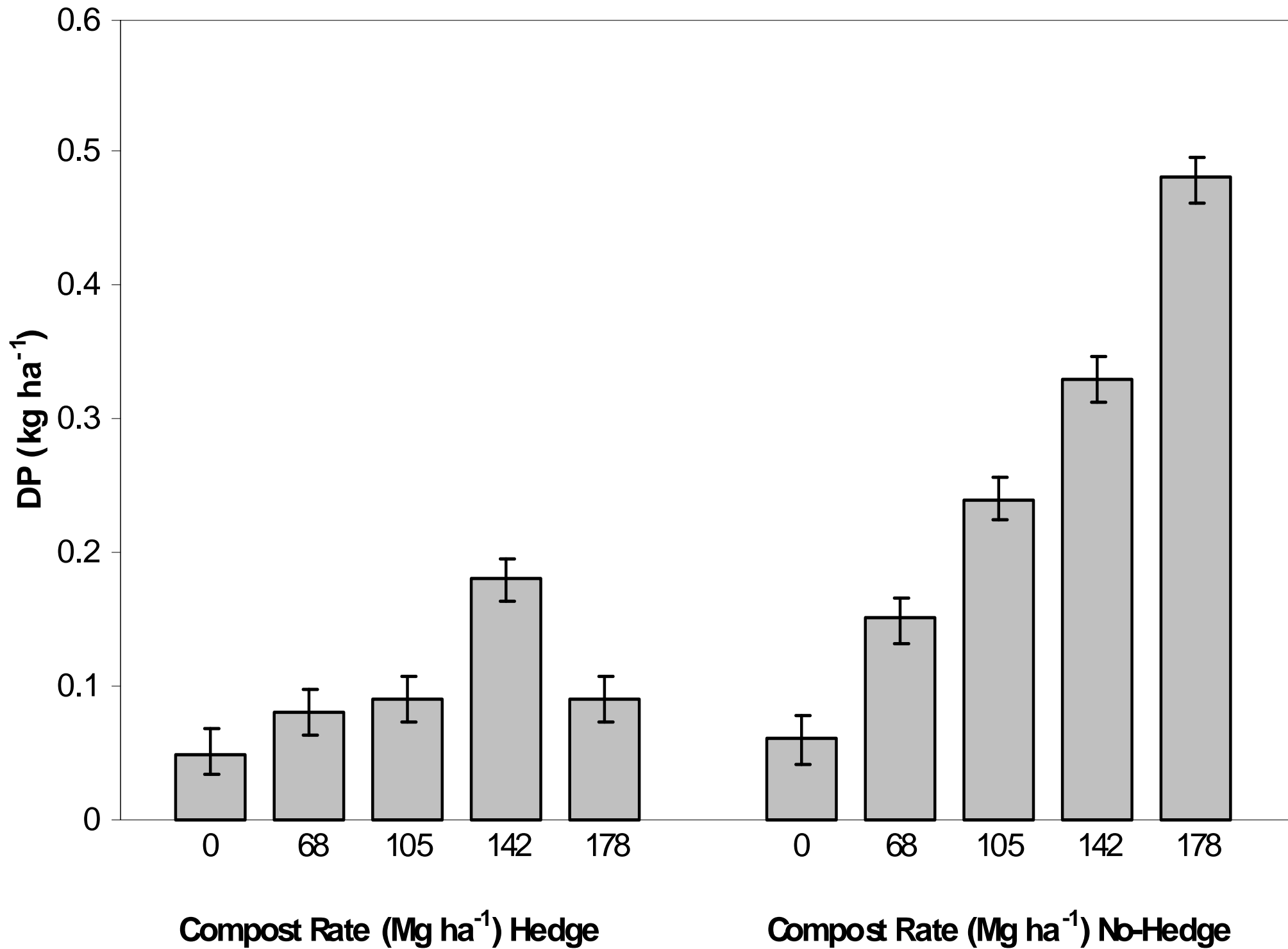
- Three 30-min rainfall simulation runs were conducted.
- The simulated rainfall events were separated by 24-hr intervals.
- The design rainfall intensity was 70 mm/hr.
- Additional inflow was introduced at the top of the plots after the third simulation run.

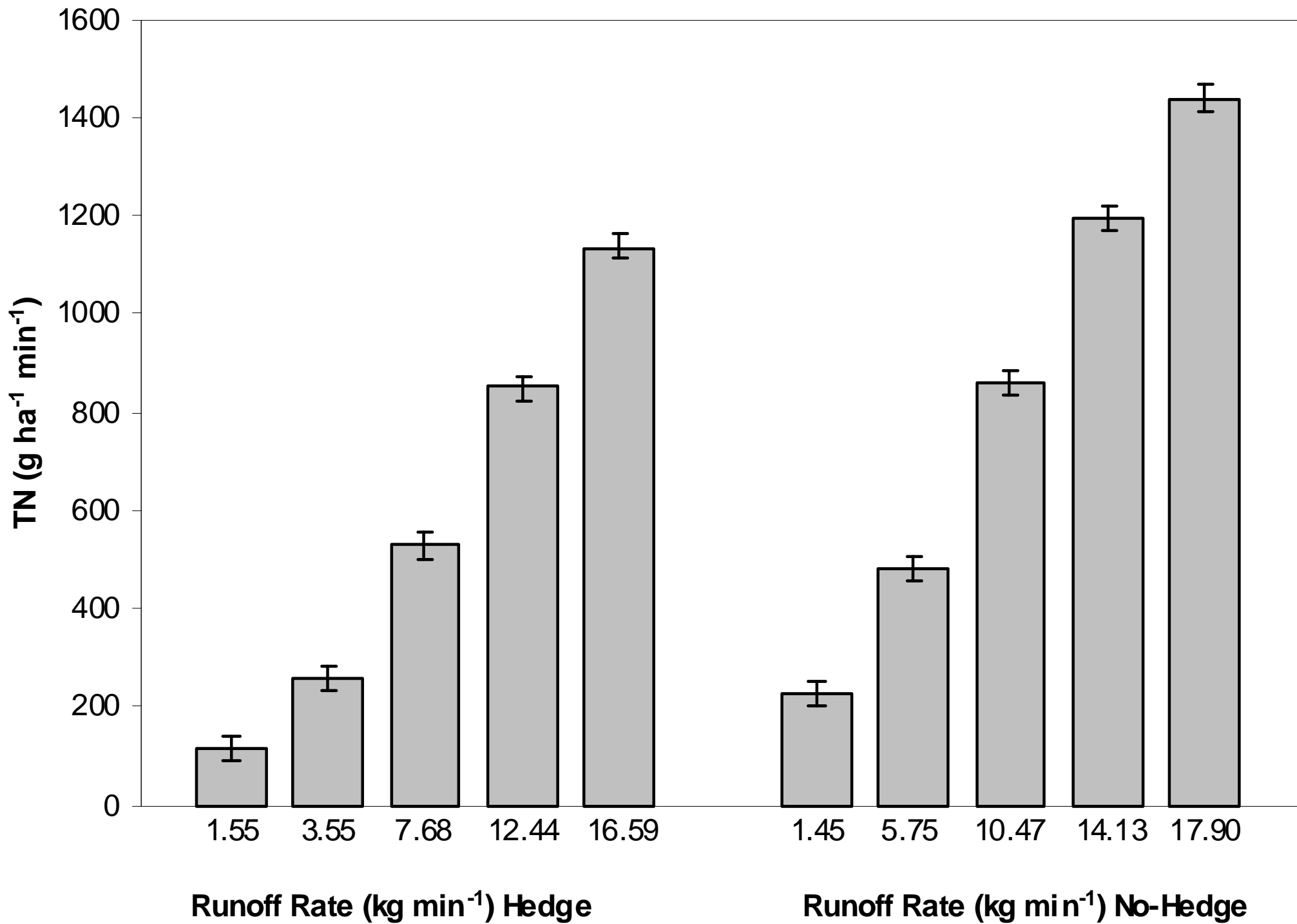


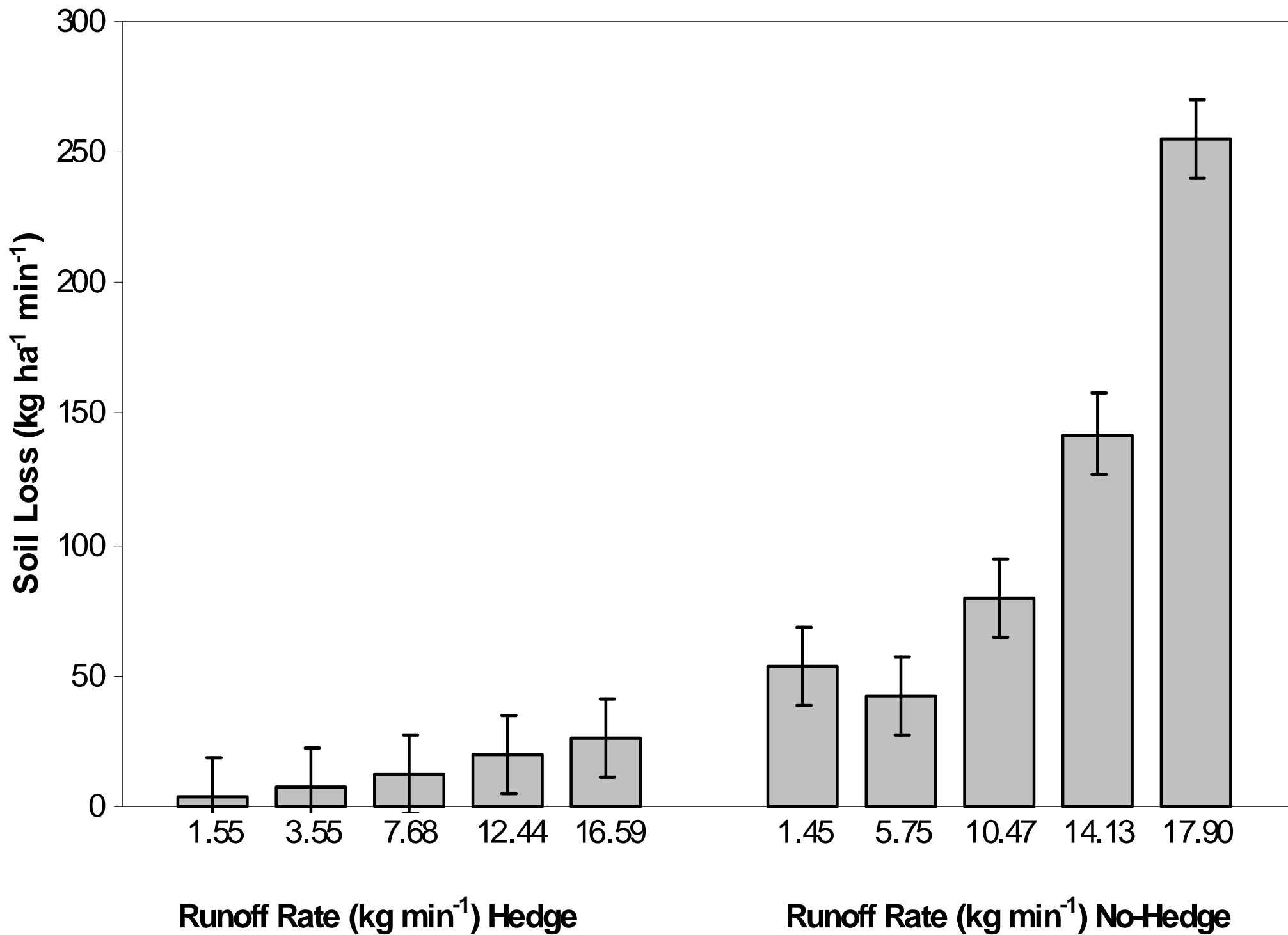












Conclusions

- Mean runoff rates on the hedge and no-hedge treatments were 17 and 29 mm, and erosion rates were 0.12 and 1.48 Mg ha⁻¹, respectively.
- Compost application rate significantly affected the transport of DP, TP, and NO₃-N in runoff.

Conclusions

- The transport of DP, TP, NO₃-N, NH₄-N, TN, runoff and erosion was reduced significantly on the plots with a grass hedge.
- The existence of grass hedge, compost rate, and inflow rate all significantly influenced runoff nutrient transport.

Conclusions

- Differences in soil loss rates were found among inflow treatments, with rates varying from 24.8 to 141 kg ha⁻¹ min⁻¹.

Thank You for Your Attention!

