

Landscape features

Impact: Soil nutrients

Reference 11

Zheng, YL; Wang, HY; Qin, QQ; Wang, YG 2020 Effect of plant hedgerows on agricultural non-point source pollution: a meta-analysis ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH, 27(20), 24831-24847. 10.1007/s11356-020-08988-7

Background and objective

Plant hedgerow is an important measure to prevent soil erosion and reduce agricultural non-point source pollution. To explore the influence of plant hedgerows on soil nutrients.

Search strategy and selection criteria

The authors conducted a detailed screening of research papers published in peer-reviewed journals from 1980 until March 2020 by searching the keywords “ hedgerow ” or “ barrier strip ” or “ living hedge ” or “ buffer strip ” or “ filter strip ” and “ soil, ” on the Web of Science, China National Knowledge Internet and Wanfang Data. 1) At least one plant hedgerow was used to control agricultural agricultural non-point source pollution (NPSP); 2) The same response variables were compared between the treatments with or without plant hedgerows (control); 3) The treatment with plant hedgerows and the control were performed under the same environmental conditions; 4) The number of replicates was reported; 5) If the data were repeatedly stated, only one of the values was selected; 6) data on soil organic matter (SOM), total N (TN), total P (TP), total K (TK), alkali N (AN), available P (AP), and readily available K (AK) were available for the treatments with or without plant hedgerows.

Data and analysis

Analyses were conducted in the Stata 15.1 statistical software, with the mean, SD and sample size as inputs. The confidence interval (CI) was set to 95%, and the standardized mean difference (SMD) was used as the statistical indicator of the effect. Before combining the analysis of SMD, the chi-square Q-test and statistic I2 are usually used for the heterogeneity test.

Number of papers	Population	Intervention	Comparator	Outcome	Quality score
53	Croplands	Hedgerows	no hedgerows	Metric: Soil total nitrogen, phosphorus, and potassium concentrations, Soil alkali nitrogen, Soil available phosphorus, Soil readily available potassium; Effect size: Standardized difference of the considered metrics between intervention and control	81%

Results

- Plant hedgerows significantly affect soil TN concentration (SMD = 1.33 (95% CI 0.98 – 1.68) and on soil TP (SMD = 0.73 (95% CI, 0.26 – 1.20). Plant hedgerow showed no significant effect on soil TK concentrations (SMD = 0.17 (95% CI – 0.13 – 0.47).
- Plant hedgerows significantly affect soil alkali nitrogen concentrations, on soil available phosphorus and on available potassium.

- concentrations
- NA
- NA

Factors influencing effect sizes

- hbhbk : NA
- NA : NA
- NA : NA

Conclusion

Hedgerows showed significant positive effects on total nitrogen, total phosphorus, alkali nitrogen, available phosphorus, and available potassium but no significant effects on soil total potassium concentrations.