

Effect of different P-sources on turf quality

Albracht, R. and M. Schlosser



4th European Turfgrass Society Conference, Germany 2014

Introduction

The economically exploitable sources of phosphate with high quality (e.g. low in Cd) are limited worldwide. This research was meant to evaluate whether P-fertilisers from alternative sources (e.g. recycling processes) are suitable for use on turf.

Materials and methods

Sand based sports field construction (DIN 2012) with 5.3 mg P₂O₅ 100 g⁻¹ on a 50/50 mix of *Lolium perenne* and *Poa pratensis* (RSM 2011) with 7 treatments:

- control (without P-fertiliser)
- single superphosphate, (18 % P₂O₅)
- meat-and-bone meal (16 % P₂O₅)
- Redox-bone-ash (39 % P₂O₅)
- sewage-sludge-ash from mono-incineration (16 % P₂O₅)
- phosphite (42 % P₂O₅)
- magnesium-ammonium-phosphate (24 % P₂O₅).

Objectives: dry matter yield, P-content in clippings, turf quality

Results

Figure 1: Dry matter yield according to the P-source.

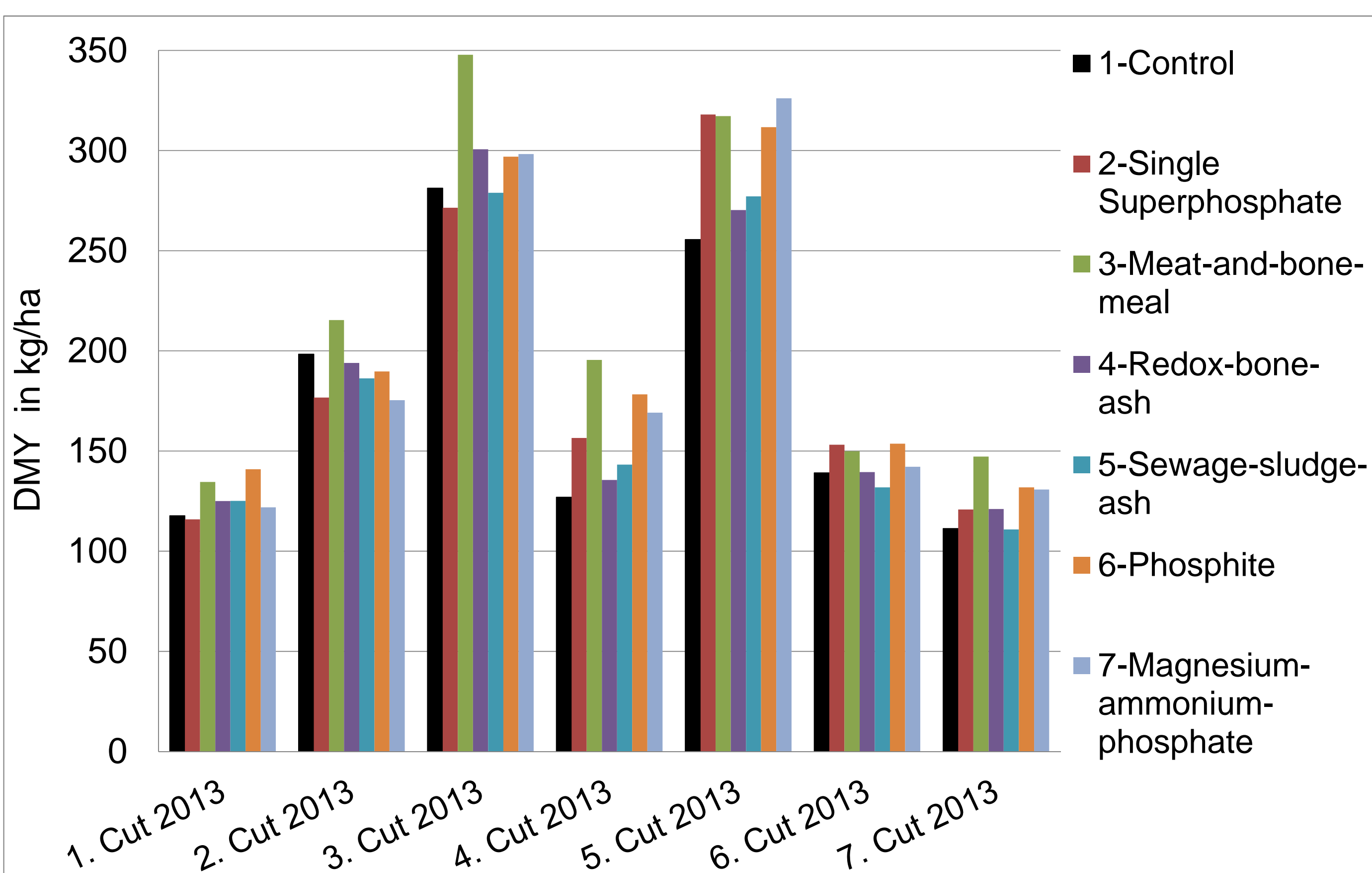


Figure 2: P-content of grass according to the P-source.

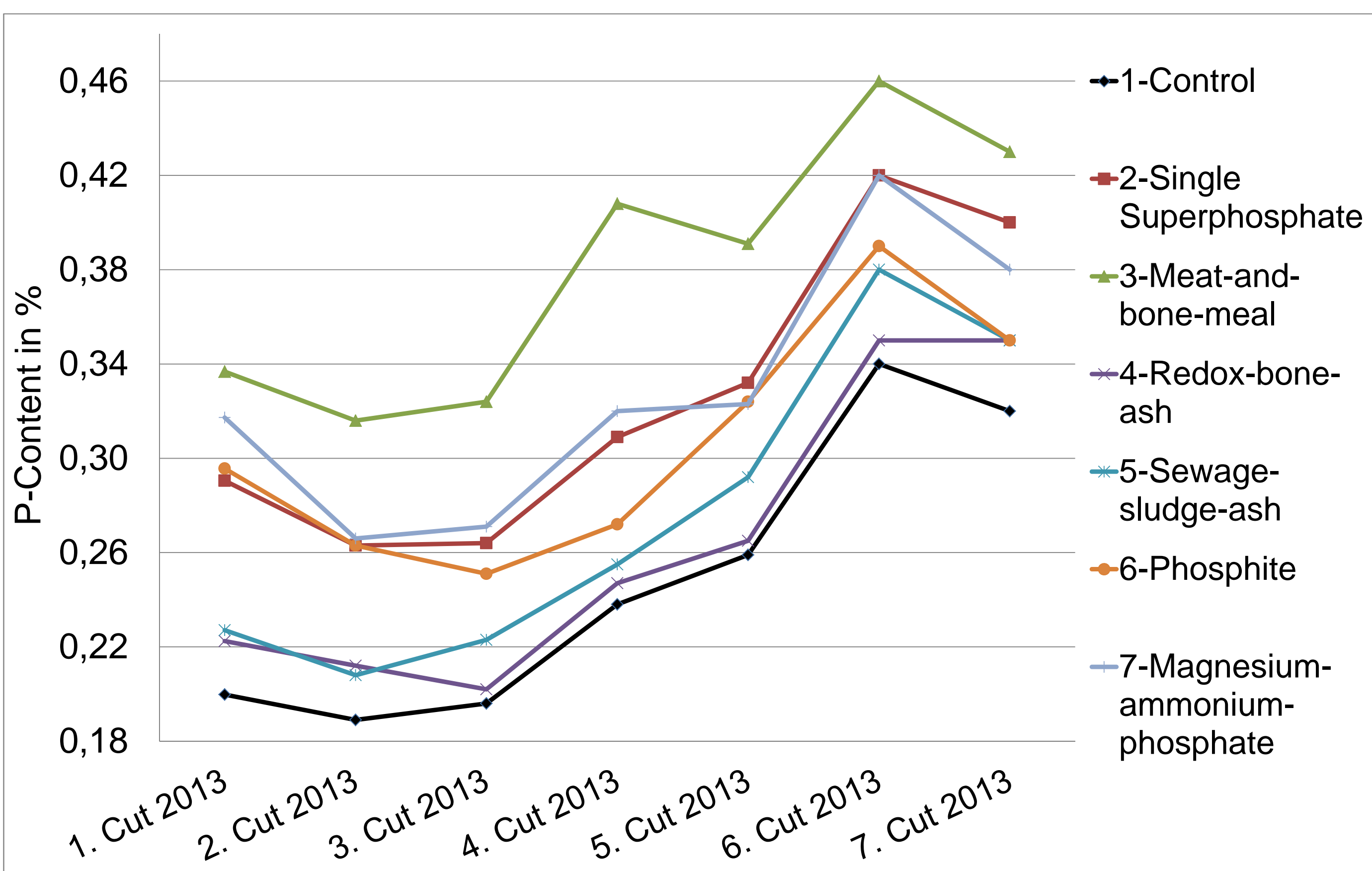


Figure 3: P-removal according to the P-source.

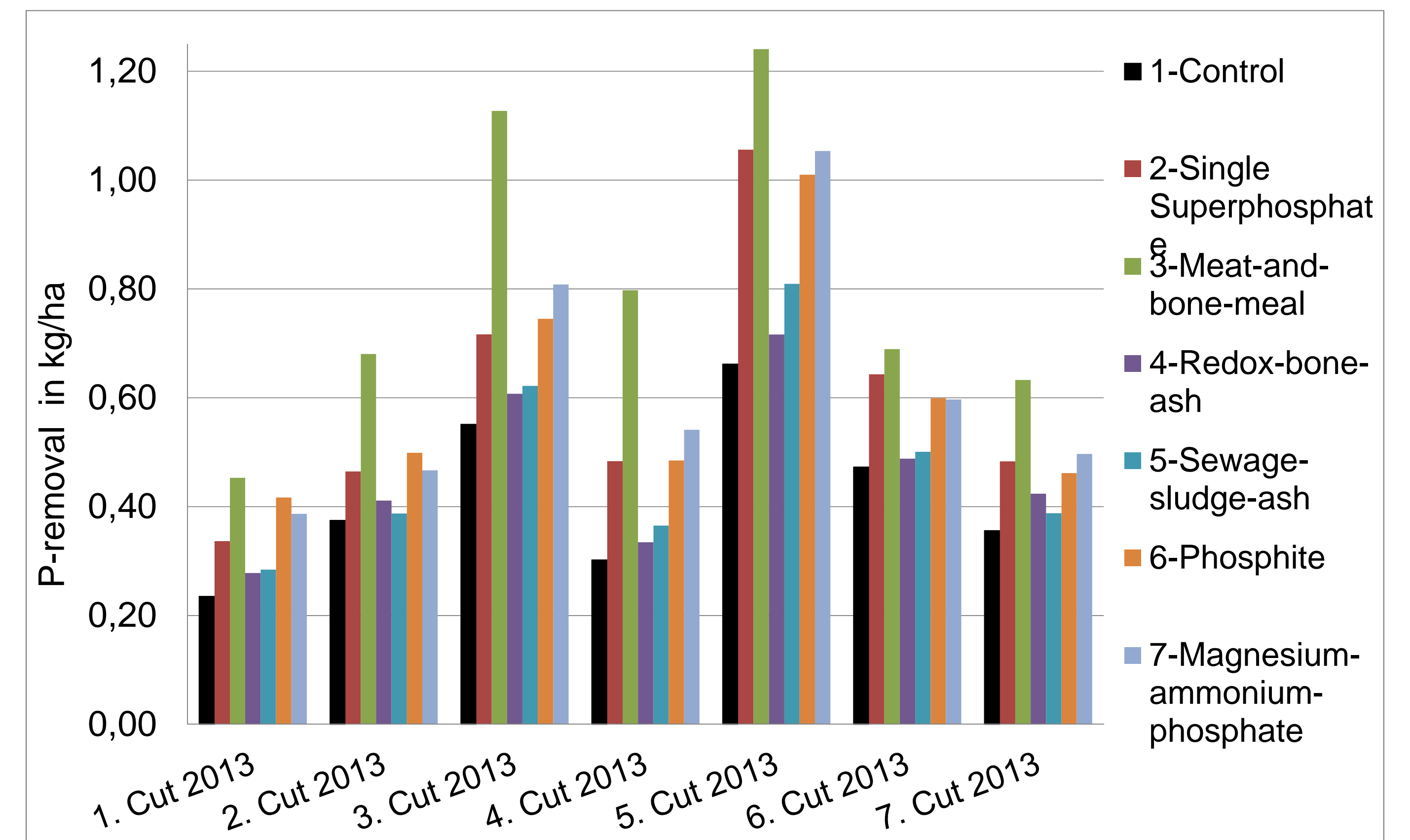


Table 1: Average DM yield, P-content, P-removal and total P-removal according to the P-source.

Treatments	Ø DM Yield (kg DM ha ⁻¹)	Ø P-content (% P i. DM)	Ø P-removal (kg P/ha ⁻¹)	Total P-removal (kg P/ha ⁻¹)
1-Control	176	0,2	0,4	3,0
4-Redox-bone-ash	184	0,3	0,5	3,3
5-Sewage-sludge-ash	179	0,3	0,5	3,4
2-Single Superphosphate	187	0,3	0,6	4,2
6-Phosphite	200	0,3	0,6	4,2
7-Mg-ammonium-phosphate	195	0,3	0,6	4,3
3-Meat-and-bone-meal	215	0,4	0,8	5,6

(Same colour = same level)

Discussion

- The P additions in any form had positive effects on these data.
- The measures of the grass clippings P-contents in all treatments indicated no P-deficiencies, 0.2 % threshold according to BERGMANN and NEUBERT (1976).
- The results showed that even the highest P-removal was below 20 kg P₂O₅ ha⁻¹ per year. That leads to the conclusion that it is possible to fertilise with lower amounts of P than actually recommended without lowering turf quality.
- In the following years the trial will show if a sufficient supply of phosphorus is possible even with P-fertilisers from recycling processes and if a stock fertilisation can be achieved.
- The redox bone ash and sewage-sludge ash from mono-incineration tended to result in second lowest levels regarding P-removal, short above the control. The future will show if the P-supply from these sources will be sufficient.

Authors

Dr. Rainer Albracht, rainer.albracht@eurogreen.de
 Dr. Michael Schlosser, schlosser@juliwa-hesa.de
 KDS – Kompetenzzentrum für Düngung und Sekundärrohstoffe e.V., Karlrobert-Kreiten-Straße 13, 53115 Bonn, Germany

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