Liming

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Factsheet about integrated weed management

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Introduction

Same as for crops, each weed species prefers a certain range of pH level. Through liming, soil acidity can be regulated and growing conditions may become less favourable for weeds to germinate and grow. Simultaneously, crop growth may be promoted with increased pH as a result of liming. By adding lime at certain points a crop rotation, the growing conditions can be diversified and thus help controlling the built-up of weed populations that consist of weeds that prefer acidic soils.

Applicability and equipment

Liming can easily be applied using either a special lime spreader or a chemical fertilizer spreader to spread the chalk product, e.g. slaked lime or powder limestone, and could be done at an interval of 3-4 years. The rate should be adapted to the soil hydrolytic acidity. Lime can either be applied dry or wet, depending on the available machinery. Lime needs some time to become effective, therefore it is best to apply in autumn.

Direct contact of lime with ammonium nitrogen from fertilizers gives ammonia volatilization, which can be avoided by application in autumn.

Efficacy and core results

There is a positive interaction between liming and organic fertilisation regarding their effect on weeds, resulting in a significantly smaller number of weeds, weed dry matter mass, number of weed species and the percentage of acidophilic weeds compared to unlimed soil[1].

Liming not only decreases an acid soils' suitability for weeds, it also increases the crop resilience, what increases its competitiveness against weeds, pests and diseases.

In a long-term manuring experiment in Lithuania the number of weed at the maturity stage of crops of the rotation was significantly (1.5-4.3 times) lower in limed soil than in unlimed soil[1].

In the same experiment the growth conditions of crops were found to be improved in limed soil fertilised with organic fertilisers, due to the interaction of the investigated factors (soil acidity and organic fertilisation). The weed number per square meter was significantly lower in the limed soil compared to the unlimed soil without organic fertilisers. Better competitive ability in crops determined a decrease in the total weed incidence[1]. See also table 1.

Soil acidity had a significant influence on the total number of weeds, number of weed species and the percentage of the annual dicotyledonous weeds and acidophilic weeds during the weed germination period, i.e. the beginning of crop growing season[1].

1| *Skuodiene, R., Repšiene, R., Karcauskiene, D., & Matyziute, V. (2021). The effect of liming and organic fertilisation on the incidence of weeds in the crops of the rotation. Zemdirbyste-Agriculture, 108(1), 27-34. https://doi.org/10.13080/z-a.2021.108.004*

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*Table 1. Agrobiological indices of weeds in the crops of rotations in a long-term manuring experiment in Lithuania in the period 2015-2019. Adapted from Skuodienė et al. (2021) . * and ** - differences significant at P<0.05 and P<0.01 respectively, between unlimed and limed soil.*

Soil acidity	Winter wheat 2016		Lupine-oats mixture 2017		Winter rape 2018		Spring barley 2019	
	ASSESSMENT							
	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Number of weed species m^{-2}								
Unlimed soil	6.1	5.8	8.6	11.4	5.0	6.1	6.6	8.4
Limed soil	3.7**	4.1**	7.0**	8.3**	4.7	6.2	5.8*	4.1**
Annual weeds %								
Unlimed soil	97.5	81.4	99.5	94.1	89.9	85.2	92.4	77.7
Limed soil	99.5	92.4**	99.8	99.3**	95.9	91.1	96.4	60.0*
Annual dicotyledonous weeds %								
Unlimed soil	91.3	73.0	97.9	95.7	93.5	94.7	99.9	65.6
Limed soil	96.3*	82.4*	96.2	96.2	84.4**	73.8**	100.0	61.6
Acidophilic weeds %								
Unlimed soil	27.7	13.0	23.7	32.2	33.3	33.3	22.1	7.1
Limed soil	4.2**	0.7**	5.5**	5.2**	4.6**	4.4**	6.4**	0.2**

Extra information

See *https://iwmpraise.eu/publications/* for all crop diversification strategies and their definitions, and for more information on integrated weed management.