



# FERTILISATION NORMS AND TERMS



## General information

- Having a will to choose a crop and to plan fertilisation, it is necessary to analyse soil agrochemical properties not rarely than every five six months. The soil has to be analysed for pH and humus, mobile phosphorus and potassium content.
- The best is when organic-mineral fertilisation system is followed. Mineral fertilisers have to be spread every year. Light soils have to be fertilised by organic fertilisers every three four years, heavier soils - every four five years.

## Fertilization norms

Farms with manure stores over 500 m<sup>3</sup> should determine fertilisation value of manure by a quick test method or in a laboratory immediately before spreading. If analysis' results are absent, one should consider that 1 tonne of mixed (such manure is most common on private farms) manure with bedding material (FYM) that has 22% of dry material contains about 5 kg nitrogen, 2.1 kg phosphorus (P<sub>2</sub>O<sub>5</sub>) and 4.7 kg potassium (K<sub>2</sub>O). Approximate coefficients for utilisation of nitrogen, phosphorus and potassium during first and later years are given in table 1.

Table 1. Coefficients for utilisation of nitrogen, phosphorus and potassium present in manure

Uptake year	Manure with bedding material		
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
I year	0.35	0.45	0.65
II year	0.25	0.15	0.15
III year	0.1	0.05	0
Total effect	0.7	0.65	0.8



Fig.1. FYM spreader with vertical screws JF AV 4000H

It is recommended to apply mineral fertilisers and manure according to defined fertiliser norms taking into consideration crop need for nutrients. Nutrients taken out of the soil with crop yield should be restored in a form of organic and mineral fertilisers.

The amount of nutrients taken by main crops and their groups are presented in table 2.

Table 2. Amount of nutrients taken by crops from soil

Crops	Production type	Nutrients kg/t		
		Nitrogen (N)	Phosphorus (P <sub>2</sub> O <sub>5</sub> )	Potassium (K <sub>2</sub> O <sub>5</sub> )
Cereals	Grains (including straws)	21-23.5	7.4-11.8	20-21.1; in rye - 125
Leguminous cereals	Grains and stalks	58-67	14-19	16-25; in lupine - 40
Sugar beet	Roots and tops	3.3	1.7	5.8
Potatoes	Tubers	4.7	1.6	5.5
Maize	Green mass	2.7	1.0	4.5
Perennial grasses	Green mass	3	0.9	3.8
Perennial grasses	Hay	16.9	4.9	21.4
Cultural pasture	Green mass	4.9	1.3	5.4



Fig. 2. Mineral fertilizer spreader Bogballe EX

Having a will to achieve the planned yield, crops have to be supplied with 10-20 % more nutrients than crop need because the crops are not able to utilise the whole amount of the nutrients.

In loam soils the norm of littered manure (FYM) should not exceed 50 t/ha for row crops, 40 t/ha for winter cereals, and in light soils 40 and 30 t/ha correspondingly. Maximal liquid manure norm applied in one time is 15-20 t/ha in any type of soil. The amount of fertiliser, introduced with manure, cannot exceed 170 kg/ha of nitrogen on average for total area of agricultural land on the farm.

## Fertilization terms

Organic fertiliser (manure, sewage sludge, composts, etc.) should be spread from drying up of soil in spring to freezing of soil in autumn. Organic

fertiliser should not be spread from 15 November to 15 March (on soils that are frozen, water saturated or are covered with snow). Manure has to be spread at more humid, colder and not windy time. Solid manure should be incorporated into the soil within 6 hours after application.

Mineral nitrogen fertilisers are soluble and they have a quick effect; therefore, they have to be spread during crop vegetation. In crop fields of winter crops and perennial grasses nitrogen fertilisers are spread after vegetation has renewed and soil has dried up allowing movement of fertilising machinery. Main nitrogen fertiliser norms for spring crops are recommended to be applied in spring and incorporated by pre-sowing soil tillage measures.

Additionally nitrogen fertilisers are applied during vegetation. Plants take up more nitrogen if they

are fertilised at smaller doses. Besides, lower leaching, washout and evaporation losses occur then. Cereals are additionally fertilised in the phase of ear emergence, row crops – about one month after the first fertilisation. The most appropriate fertilisation norm of the additional fertilisation is 30-45 kg/ha for cereals and 30-60 kg/ha for row crops.

On animal husbandry farms the area of cultural meadows and pastures should be expanded, and part of them renewed ever year. Before perennial grasses three four years it is useful to grow crops that utilise nitrogen well and that can be sown successively, e.g. maize (table 3). During this period the crops should be fertilised by manure or other organic fertilisers intensively.

**Table 3. Fertilisation planning for rotation of maize and cultural meadows and pastures**

Before installation of meadows and pastures				Grass sowing	Maintenance of pastures and meadows				
Maize				Cultural perennial grasses					
I year	II year	III year	IV year	I year	II year	III year	IV year	V year	
Soil analysis			Soil analysis			Soil analysis			
		Liming when pH < 6.5							
Fertilisation by organic fertilisers								Fertilisation by organic fertilisers	
Fertilisation by mineral fertilisers				Fertilisation by mineral fertilisers (give back 100-120% of the NPK amount taken with harvest)					

The most appropriate is to spread organic fertilisers on fourth year pasture and meadow when less than 30% of leguminous grasses remain. When leguminous grasses comprise more than 30% in the herb, it is better not to use organic fertilisers and mineral nitrogen fertilisers. Slurry and liquid manure suit perennial grass plot better. Manure should be spread straight after sowing in order not to harm the plants.

It is recommended to make fertilisation plans with help of the computer programme prepared by the Lithuanian Institute of Agriculture and the Lithuanian Agricultural Advisory Service. The fertilisation plan can also be made according to the programme on the Internet that can be found at this address: [http://www.baap.lt/education/fertilization\\_plan.htm](http://www.baap.lt/education/fertilization_plan.htm).



**Fig. 3. Hose slurry and liquid manure spreader attached to slurry tank MZT-6**

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