

Fodderbeet (*Beta vulgaris ssp. vulgaris var. Alba*)

French: Betterave fouragère; Spanish: Remolacha forrajera; Italian: Barbabietola da foraggio; German: Futterruebe, Runkelruebe

Crop data

Biennial.

Harvested part: 1st year roots (= roots + stems) and normally also leaves.

Sown in spring (directly seeded in cultivated soil).

Does not flower in 1st year, but flowers in summer in 2nd year when grown for seed.

Fodder crop harvested 6-7 months after sowing.

Plant density: 60 000-90 000 plants/ha.

Can be grown on all soils with pH > 5.

In regions with summer drought, irrigation is needed on light sandy soils.

Nutrient demand/uptake/removal

Nutrient removal by crop yielding 10 t DM/ha roots and 5 t DM/ha leaves:

Nutrient uptake/removal - Macronutrients							
Yield	Source	kg/ha					
		N	P2O5	K2O	MgO	CaO	Na2O
Roots, 10 t DM	LIK, 1990	n.a.	37	180	22	32	20
Leaves, 5 t DM		n.a.	19	180	34	91	65
Total		n.a.	56	360	56	123	85
Roots, 10 t DM	LIK, 1974	102	37	182	20	27	20
Leaves, 5 t DM		129	31	181	34	91	65
Total		231	68	363	54	118	85

Nutrient removal - Micronutrients				
Yield	Source	g/ha		
		Mn	Zn	Cu
Roots, 10 t DM	LIK, 1990	270	250	70
Leaves, 5 t DM		450	225	65
Total		720	475	135
Roots, 10 t DM	LIK, 1974	300	270	42
Leaves, 5 t DM		450	235	64
Total		750	505	106

Plant analysis data

Plant analyses data - Macro- and micronutrients									
Plant part	Stage of growth	Source	% of dry matter					ppm DM	
			N	P	K	Mg	S	Mn	B
Normal levels									
Leaf	May	N & P:	4.8	0.73	6.0	0.78	-	-	-
Root	May	Knowles et al, 1934	2.7	0.21	4.8	-	-	-	-
Leaf	June	K:	4.6	0.53	5.0	0.75	-	-	-
Root	June	Draycott, 1972	2.4	0.41	2.5	-	-	-	-

Leaf	July	Mg:	3.0	0.40	4.0	0.48	-	50	50
Root	July	Durrant & Draycott, 1971	1.0	0.38	1.3	-	-	-	-
Leaf	Aug.	Mn & B:	2.0	0.34	3.5	0.23	-	-	-
Root	Aug.	Hengill, 1990	0.8	0.27	0.8	-	-	-	-
Leaf	Sep.		1.9	0.21	3.0	0.20	-	-	-
Root	Sep.		0.8	0.13	0.8	-	-	-	-
Deficiency levels									
Middle leaves	Half way through the life of the crop	Hengill (1990)	3.5	0.35	2.0	0.20	0.20	20	20

For good storage quality, special attention must be paid to B. Na can replace K up to approximately half the amount required.

Fertilizer recommendations

To reduce the risk of root diseases, a pH >6.0 is desirable.

Due to the long growing period, the crop can make effective use of organic manures. FYM can be ploughed into the soil before sowing. Urine/slurry can also be ploughed in before sowing or may be incorporated into the soil with a cultivator after ploughing but before sowing; in the latter case the amount must not exceed 40 t/ha to avoid germination problems. Urine/slurry may also be applied between the rows in early summer, preferably by injection.

The need for mineral fertilizers is calculated from the difference between the plants' total requirement and the amount of plant-available nutrients in the organic manures supplied. Because the crop is normally used on the farm on which it is grown, organic manure is usually available in quantity, so most of the plants' requirements are supplied in this form; often the only mineral fertilizer added is straight N.

The normal pattern of application is:

- two-thirds N, all P, all K before sowing (as organic manures)
- one-third N two months after sowing (as mineral fertilizer).

Preferred nutrient forms

N - ammonium or ammonium nitrate
P - water-soluble
K - as KCl.

Present fertilizer practices

Denmark

For expected yield of 10 t DM/ha roots and 3 t DM/ha leaves, on soil of good P and K status:

- 180 kg/ha N, 80 kg/ha P₂O₅, 240 kg/ha K₂O.

With lower or higher yield expectations the rates of P₂O₅ and K₂O are adjusted accordingly.

The N requirement may also be calculated (in kg/ha) as 245 minus Nmin in spring.

Germany

For soils of good P and K status (Stufe C):

- low yield (8 t DM/ha roots): 120 kg/ha N, 60 kg/ha P₂O₅, 260 kg/ha K₂O.
- normal yield (12 t DM/ha roots): 180 kg/ha N, 90 kg/ha P₂O₅, 310 kg/ha K₂O.
- high yield (16 t DM/ha roots): 220 kg/ha, 120 kg/ha P₂O₅, 350 kg/ha K₂O.

Great Britain

For soils of good P and K status (index 3), after arable crops:

- 125 kg/ha N, 50 kg/ha P₂O₅, 175 kg/ha K₂O (or 75 kg/ha K₂O + 150 kg/ha Na).

Further reading

BOYSEN, P.; OERING, M.: Richtwerte fuer die Duengung (12th ed.). Landwirtschaftskammer Schleswig-Holstein, Germany (1990)

DRAYCOTT, A.P.: Sugar Beet Nutrition. Applied Science Publishers Ltd., London, UK (1972)

DURRANT, M.; DRAYCOTT, A.P.: J. Agric. Sci. Camb. 77, 66-68, UK (1971)

Author: C.A. Pedersen, The Danish Agricultural Advisory Service, Aarhus, Denmark