

Application of different compost types at different dates and its effects on shoot growth and scab infection (cv. 'Elstar')

Auswirkungen der Düngung mit verschiedenen Kompostarten zu unterschiedlichen Applikationszeitpunkten auf das Triebwachstum und die Schorfinfektionen bei der Apfelsorte 'Elstar'

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Scope:

Harmen and Carla Peters' market garden in Lobith is switching from conventional culture with "fertigation" to bio-dynamic culture with fertilization with compost. In this garden changes in soil, fertilization and growth will be examined over a period of several years. This report describes the observations in the first year. In the Netherlands transition periods from conventional to biological culture are characterized by a shortage of nitrogen in the leaves and consequently weak buds in the next season.

Description of the garden:

The soil of the garden has been deposited by the river Rhine. It consists of good structured calcareous silt over sand, the latter on a depth of 70 to 90 cm, with $20\% \leq 16 \mu$, 1,8 % organic matter and $\text{pH} = 7,6$. The top soil (over 20 cm) has a good texture.

Trees are planted in 5 rows. This remained from the conventional past. Because of the high soil fertility the distances between the trees are too small. In June roots were cutted. Weeds are regulated by hoe. In the dry summer of 1992 the orchard was watered through the "fertigation" line. In this garden the variants were treated with two types of compost and two times of application, each combination in two replications.

Compost type	%N	%P	%K	Quantity
Type 1	4,7	3,1	4,9	18 t/ha
Type 2	6,0	4,2	17,4	15t/ha

Type 1: Compost from woodcuttings and duck's manure (3:1)

Type 2: Compost from deep litter manure from a dairy farm

The compost was applied in November 1991 or in March 1992.

The quantities correspond to the same quantity of nitrogen.

Effects of various types of compost and of different application times on three years old 'Elstar' trees

Type of compost	time of application	NO ₃ in kg/ha in topsoil 0-60 cm				Depth of sand in cm.	% N in leaves 12/8	vigour 15/8	% term. shoots n.t. ¹	quant. fruits class 12/8	% leave scab 15/8
		Nov.	Mar.	May	Aug.						
wood compost	11/91	30	79	58	44	85	1,87	strong	15	4	46
wood-compost	3/92	30	58	46	38	80	1,97	moderate strong	11	4	32
manure-compost	11/91	30	85	93	71	70	1,91	moderate	12	4	21
manure-compost	3/92	30	55	54	34	85	1,8	very strong	21	3	50

n.t. = not terminated

All variants of the experiment had in common:

- * Little attack by aphids
- * Some attack by apple leaf midge
- * Green colour of the leaves
- * Little leaching of nitrate
- * An active soil life

Conclusions:

- * In all variants the nitrate contents of the soil were as expected: compost from manure releases nitrate earlier than compost from wood. After application in November nitrate contents are higher than after application in March. In the layer between 60 and 90 cm no differences in nitrate contents between variants have been found but they may develop later.
- * There is no relationship between the nitrate content of the soil and vigour. Vigour depends on the depth of the sand layer and on the quantity of fruits. Both a deep sand layer and few fruits are favourable to growth. This is an established relation.
- * In all variants the nitrogen contents of the leaves were low. Nevertheless, the colour of the leaves was fairly green. Vigour seems negatively correlated with nitrogen content of the leaves (not significant).
- * The attack by scab is proportional to vigour. This is also a known relationship. This is too rarely taken into consideration for the prevention of scab.
- * No differences in attacks by insects were observed between the variants.