O rezistență mijlocie au prezentat soiurile *Dippes, Lochow, Svalöf 01104* și *Cenad 88* care aparțin la specia *Avena sativa*, trecute în ordinea rezistenței.

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ZUSAMMENFASSUNG

BEOBACHTUNGEN ÜBER DEN BEFALL DES HAFERS MIT *USTILAGO AVENAE* (PERS.) JENS.

In vorliegender Arbeit wird von den Verfassern eine vergleichende Untersuchung über den Infektionsgrad von Flugbrand (Ustilago avenae Pers. Jens.) bei 10 Hafersorten and-arten nach den Methoden Zade, Reed und einer originellen halbnatürlichen Methode geboten.

Aus den erhaltenen Daten geht hervor, dass die wirksamste Methode der künstlichen Infektion die Zade'sche ist, gefolgt von der Methode nach Reed. Man nimmt an, dass die besseren Ergebnisse durch die Methode nach Zade auf die Verwendung von Regenwasser bei der Herstellung der Sporensuspension zurückgeführt werden können, welckes sich als ein günstigeres Medium für die Keimung erweist.

Als die widerstandsfähigsten Sorten gegen diese Pflanzenkrankheit haben, sich Richland und Markton Oats 166 erwiesen, während die Art Avena nuda und Avena sativa mit den Sorten Peragis und Bărăgan 878 am anfälligsten waren.

INSTITUTUM AGRONOMICUM „Dr. P. GROZA" CLUJ (ROMANIA)
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SOME DATA CONCERNING NITROGEN LOSSES IN A PODZOLIZED BROWN-RED FOREST SOIL

by L. CALANCEA

The nitrates resulted from the process of the nitrification or introduced in to the soil as fertilizers may lead to nitrogen losses due either to their leaching or denitrification (formation of gaseous products: N_2O and N_2).

The losses by denitrification as N_2O and N_2 may by very high. According to the data obtained by Hauch and Melsted (4) under laboratory conditions the nitrogen losses reached 40—60% from the nitrate-N introduced in to the soil. Other authors have reported on similar findings (1, 2, 5, 6).

In order to obtain further information about nitrogen losses in soil, we have studied the influence of the nature of N-fertilizers, in the absence or in the presence of other fertilizers, in a podzolized brown-red soil (pH=4,28/KCl).

Materials and Methods. The experiments were carried out in vegetation pots (each containing 4 kg of soil), in four variants (see Table 1), each in four repetitions.

Nitrate-N was labelled with ^{15}N in 1,36% isotopic concentration.

Each pot was sowed with 30 oat seeds. When the seedlings reached about 10 cm height, they were thinned maintaining only 25 seedlings per pot. The soil moisture was kept constant during the wheole period of experiments at 70% of the water-holding capacity.

The plants were harvested at the milky stage of ripeness (by 3 months from the sowing). The were allowed to dry, at the beginning at room temperature, and later at 105°C. The dried plants were ground and homogenized, and analyzed for their total N and ^{15}N content, according to the Kjeldahl method, and means of mass spectrometer, respectively (3).

After harvesting the oat, soil samples were taken for total N and ^{15}N analyses, and the remaining soil was sowed with mustard. It is known that this plant absorbs high amounts of nitrogen from the soil. Mustard was harvested at the stage of flowering, thereafter it was dried and analyzed for ts total N and ^{15}N contents. The soil again was submitted to these analyses.

Results. The soil samples taken ofter the oat harvest contained less than 1% from the initial ^{15}N concentration.

The mustard plants and the soil sample taken after harvesting the mustard also were very poor in ^{15}N (under 1% from the initial ^{15}N concentration).

Table 1

Nitrogen losses in a podzolized brown-red forest soil following its fertilization

Variants	Fertilizers	Nitrogen losses from nitrate %	Medium value of nitrogen losses from nitrate %
N	*A*. NH_4 $^{15}NO_3$ (200 mg N/pot)	67.3	65.2
	B. NH_4 $^{15}NO_3$ (100 mg N/pot), and $CO(NH_2)_2$ (100 mg N/pot)	69.2	
	C. NH_4 $^{15}NO_3$ (100 mg N/pot, and NH_4OH (100 mg N/pot)	64.8	
	D./NH_4 $^{15}NO_3$ (100 mg N/pot), and $CO(NH_2)_2$(50 mg N/pot), and NH_4OH (50 mg N/pot)	69.8	
N + P	*E*. $Na_2NHPO_4 \cdot 12H_2O + NaH_2PO_4 \cdot H_2O$ (100 mg P_2O /pot) + A	55.5	59.2
	E + B	65.8	
	E + C	53.3	
	E + D	61.8	
N + P + K	*F*. K_2SO_4 (100 mg K_2O/pot) + A + E	59.5	60.9
	F + B + E	62.0	
	F + C + E	63.4	
	F + D + E	58.7	
N + P + +K + manure	A + E + F + manure	68.0	68.0

The nitrogen losses from nitrates were calculated as differences between the nitrate amount introduced in the soil and the amount absorbed by the oat plants. The results are given in Table 1.

It shows that after the 3 months of oat growing important amounts of nitrogen were lost (53.3—69.8% from the initial amount of ^{15}N). These losses are due to denitrification and not to leaching as during the whole experimental period the seepage waters of pots was collected and returned to the soil.

The table also demonstrates that the mixtures contaning ammonium nitrate and urea without or with ammonium hydroxide led to higher N losses than ammonium nitrate alone or the mixture of ammonium nitrate and ammonium hydroxide. The losses were relatively lower when

the nitrogen fertilizers were added in combination with P and K. The decrease in N losses should be ascribed to a better assimilation of N by the plants in the presence of added P and K. This effect of P and K is diminished by farm-yard manure.

Discussion. The higher nitrogen losses from the mixtures of ammonium nitrate an urea without or with ammonium hydroxide in the soil studied may the explained as follows: a) urea-nitrogen is more rapidly nitrified as compared with ammonium contaning fertilizers) (e.g. ammonium sulfate); b) urea favours the accumulation of nitrite in the soil (8); c) the Wijler and Delvich reaction (7) $3HNO_2 \rightleftarrows 2NO + HNO_3 + H_2O$ takes place more frecquently in acid soils (so in our soil, pH 4.28) than in neutral ones.

The increase of nitrogen losses in the presence of manure indicates that manure may stimulate, under certain conditions, the process of denitrification.

Conclusions. 1. The nitrogen losses from nitrates in a podzolized brown-red soil are high. The highest losses occur in the mixtures containing ammonium nitrate and urea.

2. P and K fertilizers dinimish the nitrogen losses, but their effect is decreased by farm-yard manure.

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