

THE INFLUENCE OF NITROGEN CHEMICAL SOURCES FROM FOLIAR FERTILIZERS ON P MOBILITY IN SUNFLOWER PLANT

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ABSTRACT

In order to quantify the influence of nitrogen chemical sources from complex foliar fertilizers (CFF) on P absorption through the plant teguments and his translocation in sunflower vegetative organs (leaves, stems and tops), as well the influence on the fresh and dry weight of these organs view, the labelled phosphorus (³²P) was used, and diluted CFF solution have been applied only on a part of the leaves while the P determination have been done only in the plant organs untouched by CFF solution.

The data obtained, in a green house experiments, have revealed that P absorption through plant teguments was significantly higher in the presence of NH₄NO₃ and urea as N source, the specific radioactivity level being 529 Cpm/mg P in leaves, opposite to those on which ³²P from complex foliar fertilizer solution has been applied.

The fertilising composition for foliar application having a pronounced environmentally protective effect, are recommended, especially for crop growing in the areas with restrictions to usual soil fertilisation.

OBTAINED RESULTS

The obtained results are presented in Tables 1-6.

Table 1 Influence of nitrogen chemical forms (A) in complex foliar fertilizers solutions and their reaction (B) on P uptake and translocation in sunflower plants (crossed cvr. Fundulea 350) as disclosed by specific radioactivity (SRA, counts per minutes, Cpm) of ³²P in leaves opposite to those on which ³²P labelled diluted CFF solution has been applied

Nitrogen chemical forms (A)	pH of the diluted solution (B)			Average A
	4.5	5.5	6.5	
N ₀	429	225	378	343
N-NH ₄ (1000 ppm N)	225	236	349	270
N-(NH ₂)CO (1000 ppm N)	247	278	511	345
N-NH ₄ NO ₃ (1000 ppm N)	362	272	944	529
Average B	317	253	546	
LSD	A Factor			AxB
5%	67	58	116	
1%	91	79	158	
0.1%	123	106	213	

Table 2 Influence of nitrogen chemical forms (A) in complex foliar fertilizers solutions and their reaction (B) on P uptake and translocation in sunflower plants (crossed cvr. Fundulea 350) as disclosed by specific radioactivity (SRA, counts per minutes, Cpm) of ³²P in inflorescences (tops)

Nitrogen chemical forms (A)	pH of the diluted solution (B)			Average A
	4.5	5.5	6.5	
N ₀	670	638	554	621
N-NH ₄ (1000 ppm N)	862	903	976	914
N-(NH ₂)CO (1000 ppm N)	790	938	713	814
N-NH ₄ NO ₃ (1000 ppm N)	1293	1098	1143	1178
Average B	904	894	846	
LSD	Factor A			AxB
5%	138	120	240	
1%	189	163	327	
0.1%	254	220	439	

Table 3 Influence of nitrogen chemical forms (A) in complex foliar fertilizers solutions and their reaction (B) on P uptake and translocation in sunflower plants (crossed cvr. Fundulea 350) as disclosed by specific radioactivity (SRA, counts per minutes, Cpm) of ³²P in stems beneath the touched leaves with ³²P labelled diluted CFF solutions

Nitrogen chemical forms (A)	pH of the diluted solution (B)			Average A
	4.5	5.5	6.5	
N ₀	555	576	481	537
N-NH ₄ (1000 ppm N)	610	863	768	757
N-(NH ₂)CO (1000 ppm N)	650	678	611	646
N-NH ₄ NO ₃ (1000 ppm N)	1056	924	863	948
Average B	718	760	681	
LSD	Factor A			AxB
5%	134	116	233	
1%	183	158	317	
0.1%	246	213	426	

MATERIALS AND METHODS

Experience has been organized in such Mitscherlich vessels, with capacity of 10 kg dry soil in green house, dedicated facilities for conducting such experiments. The labelled diluted CFF solutions were applied only on a part of the leaves, while the P and ³²P measurements and determinations were made only on those plant organs that were untouched by the CFF solutions.

The experimental factors were:

A. N chemical sources

a₁-no N

a₂-N-NH₄

a₃-N-(NH₂)₂CO

a₄-N-NH₄NO₃

Single concentration in the diluted solution was 1000 ppm N (1g/l)

B. pH of diluted solutions applied

b₁-4.5

b₂-5.5

b₃-6.5

In each of the 12 solutions were introduced 0.25 mCi ³²P for to obtain a specific radioactivity of 0.5 mCi. Measurement of radioactivity was performed in one gram of dry material (powder conditioned), with a proportional counter with gas flow coupled to a counting facility. The amount of ³²P absorbed per unit leaf area, per unit time was expressed as cpm / mg P.

Table 4 Influence of nitrogen chemical forms (A) in complex foliar fertilizer solutions and of their reaction (B) on the dry substance content (g) in the stems beneath the touched leaves with ³²P labelled diluted CFF solutions in sunflower plants

Chemical form and concentration of N (A)	pH of diluted 1 % CFF solution (B)			Average (A)
	4.5	5.5	6.5	
N ₀	15.52	16.12	15.67	15.77
N-NH ₄ (1000 ppm N)	13.75	13.80	14.67	14.03
N-(NH ₂)CO (1000 ppm N)	14.05	14.80	14.32	14.67
N-NH ₄ NO ₃ (1000 ppm N)	13.93	14.42	13.93	14.41
Average B	15.77	14.03	14.67	
LSD	Factor A			AxB
5%	0.81	0.70	1.41	
1%	1.11	0.96	1.29	
0.1%	1.49	1.29	2.58	

Table 5 Influence of nitrogen chemical forms (A) in complex foliar fertilizer solutions and of their reaction (B) on the dry substance content (g) in inflorescences (tops), of sunflower plants

Chemical form and concentration of N (A)	pH of diluted 1 % CFF solution (B)			Average A
	4.5	5.5	6.5	
N ₀	4.55	6.30	4.25	4.68
N-NH ₄ (1000 ppm N)	4.25	4.05	5.40	4.57
N-(NH ₂)CO (1000 ppm N)	4.43	4.42	4.73	4.35
N-NH ₄ NO ₃ (1000 ppm N)	4.27	4.38	3.73	4.82
Average B	4.52	4.67	4.62	
LSD	Factor A			AxB
5%	0.38	0.33	0.66	
1%	0.52	0.45	0.90	
0.1%	0.70	0.61	1.21	

Table 6 Field trial data a meadow cultivated with *Dactylis glomerata* L., on a hapludalf soil at Vladeni - Brasov to relieve the environmentally protective recovery (apparent productive recovery - APR) of leaf applied nutrients (LAN), Soil fertilization uniform through, with a granulated complex fertilizer applied at a rate of 50 kg/ha for both P₂O₅ and K₂O

Fertilizer treatments (g CFF/ha) as 1% diluted solution	Dry matter yield (t/ha)	NO ₃ -N in plant dry matter (ppm)	Nutrients in plant dry matter (ppm)			APR of LAN (%)		
			N	P	K	N	P	K
Control (water sprayed)	3.34	344	1.65	0.37	1.81	-	-	-
50 kg N/ha	4.23	293	2.15	0.38	1.78	-	-	-
CFF RISSA 6232	5.21	188	1.85	0.45	1.92	2.89	1.05	3.42
CFF RISSA 6236	4.39	179	1.94	0.44	2.00	1.70	0.58	2.02
CFF RISSA 6237	4.74	147	2.22	0.46	2.02	2.34	0.87	2.94
CFF RISSA 6238	4.74	117	1.95	0.46	2.05	2.47	0.87	2.99
LSD 5%	0.75	35	0.15	0.06	0.25	-	-	-



CONCLUSIONS

The data obtained, in a green house experiments, have revealed that P absorption through plant teguments was significantly higher in the presence of NH₄NO₃ and urea as N source, the specific radioactivity level being 529 Cpm/mg P in leaves, opposite to those on which ³²P from complex foliar fertilizer solution has been applied.

Fertilizer compositions for foliar application that have a pronounced environmentally protective effect are particularly desirable for use in crop production areas that are subject to restriction on normal soil fertilizer dressings.

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