Saure Böden die schwach an pflanzenverfügbaren Mn versorgt sind, sind hauptsächlich diejenigen die sich auf sandigen äolienen Ablagerungen gebildet haben; bei diesen können auch Mangelerscheinungen an Mn vortreten.

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SOME PECULIARITIES OF NPK PROPORTION AND CONTENTS DURING ONTOGENESIS IN WINTER WHEAT

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The fact of knowing the peculiarities of the chemical composition of plants is of interest for the diagnosis and interpretation of results in nutritional researches (2).

Material and Method

The experimented winter wheat varieties (Bezostaia 1, intensive; Harrach and Cluj 11, semi-intensive and Cluj 722 extensive),were grown in field on the same fertilizing, and harvested and analysed during various vegetative phases.

Nitrogen was determined by following the Kjeldahl method; calorimetric phosphorus and potassium with photometer with flame.

Results

Inasmuch as the quantitative aspect of essential nutritive elements is concerned, although known, there should be stressed the fact that phosphorus is to be found in a very small quantity as measured against nitrogen and potassium (tab.1.)

The distribution of NPK elements in the vegetative parts of wheat displays a richer and more constant matter in the leaf than in root or stalk (tab.1).

One of the most important feature of mineral composition in wheat is its variation during ontogenesis which consists in the development of NPK contents till stem-extension stage and then its gradual decrease during the subsequent vegetative periods owing to the phenomena of "dilution" (4) and "translocation" (3) (tab.1).

Table 1

The NPK contents in winter wheat during ontogenesis

Variety	Vegetative phase	N Total % Root	Leaf	Stalk	Ear	Grain	P Total % Root	Leaf	Stalk	Ear	Grain	K Total % Root	Leaf	Stalk	Ear	Grain
Bezostaia 1	Three leaves	1'00	3'94				0'17	0'42				0'38	3'22			
	Stem extension	1'03	3'86	2'31			0'11	0'34	0'28			0'59	3'97	4'43		
	Earing	0'60	2'73	0'55	1'98		0'08	0'26	0'12	0'40		0'61	2'08	1'65	1'33	
	Milk ripeness	0'54	2'71	0'31	1'76		0'09	0'24	0'13	0'32		0'41	1'67	0'89	0'67	
	Full ripeness	0'39	0'32	0'16	0'64	1'88	0'07	0'09	0'06	0'19	0'44	0'30	1'18	0'91	0'49	0'42
Cluj 11	Three leaves	1'20	3'97				0'17	0'46				0'40	3'40			
	Stem extension	1'42	3'54	2'68			0'14	0'48	0'36			0'75	3'68	5'21		
	Earing	0'47	2'40	0'44	1'82		0'06	0'25	0'12	0'37		0'59	2'36	1'39	1'20	
	Milk ripeness	0'71	2'12	0'60	1'95		0'14	0'24	0'18	0'33		0'84	1'97	1'52	0'60	
	Full ripeness	0'41	0'30	0'14	0'46	1;89	0'06	0'08	0'06	0'21	0'44	0'30	0'85	0'92	0'25	0'43
Cluj 722	Three leaves	1'72	5'17				0'17	0'47				0'65	4'31			
	Stem extension	1'38	3'91	2'99			0'10	0'34	0'22			0'63	3'66	5'02		
	Earing	0'58	2'96	0'68	1'98		0'07	0'20	0'08	0'31		0'44	2'63	1'74	1'28	
	Milk ripeness	0'88	1'12	0'74	2'16		0'10	0'22	0'10	0'35		0'69	1'87	1'19	0'83	
	Full ripeness	0'39	0'24	0'15	0'50	1'79	0'04	0'06	0'04	0'14	0'41	0'41	0'78	0'68	0'37	0'46
Harrach	Three leaves	1'17	3'53				0'20	0'40				0'40	3'50			
	Stem extension	1'00	3'46	2'26			0'13	0'30	0'22			0'70	3'65	4'20		
	Earing	0'74	2'30	0'85	2'02		0'13	0'23	0'16	0'34		0'59	2'31	1'88	1'33	
	Milk ripeness	0'60	2'30	0'40	1'82		0'12	0'21	0'14	0'29		0'50	1'80	1'20	0'65	
	Full ripeness	0'45	0'40	0'11	0'64	2'00	0'06	0'11	0'04	0'22	0'43	0'30	1'15	0'99	0'61	0'50

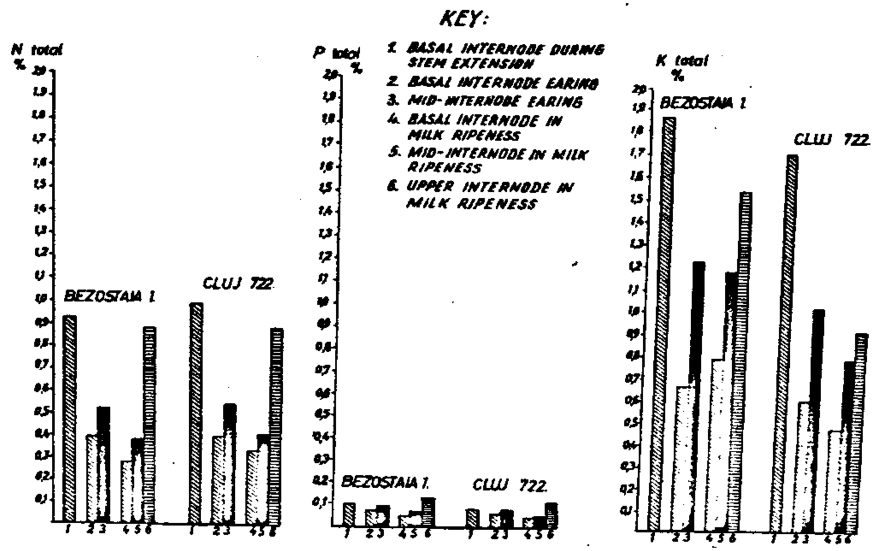

FIG. 1. THE VARIATION OF NPK CONTENTS IN STALK INTERNODES IN WINTER WHEAT

Because of the modification which the NPK contents undergo, the diagnosis of the supply with nutritive substances in wheat is recommended to be established beginning with the two-leaf stage to earing (5,6); the analyses made after earing do not reveal the differences, aven in case of using large doses of fertilizers (6).

Variations in NPK contents owing to development stage were noticed not only in the organs of plants but in their tissues as well.

Thus, the jointed stalk of wheat during the same phenophase is formed of internodes having different mineral composition; the internodes at the basis have a low NPK content but higher towards the upper parts (fig.1). The explanation to this is the progressive lengthening and lignification of internodes from base towards tip.

Owing to the low phosphorus content the proportion of nitrogen and potassium to phosphorus in wheat is generally very high all along ontogenesis (tab. 1 and 2).

Table 2

Phosphorus proportion to nitrogen and potassium during ontogenesis

Variety	Vegetative phase	Root			Stalk			Leaf			Ear			Grain		
		P	N/P	K/P	P	N/P	K/P	P	N/P	K/P	P	N/P	K/P	P	N/P	K/P
Bezostaia 1	Three leaves	1	5.8	2.2	-	-	-	1	9.4	7.6	-	-	-	-	-	-
	Stem extension	1	9.3	5.3	1	8.2	15.8	1	11.0	11.6	-	-	-	-	-	-
	Earing	1	7.5	7.6	1	4.8	13.7	1	11.5	8.0	1	4.9	3.3	-	-	-
	Milk ripeness	1	5.9	4.5	1	2.3	6.8	1	11.2	7.0	1	5.5	2.0	-	-	-
	Full ripeness	1	5.5	4.3	1	2.6	15.0	1	3.5	13.0	1	3.3	2.6	1	4.2	0.9
Cluj 11	Three leaves	1	7.0	2.3	-	-	-	1	8.6	7.3	-	-	-	-	-	-
	Stem extension	1	10.1	5.2	1	7.4	14.0	1	7.3	7.6	-	-	-	-	-	-
	Earing	1	7.8	9.8	1	3.6	11.6	1	9.6	9.4	1	4.9	3.2	-	-	-
	Milk ripeness	1	5.0	6.0	1	3.3	8.4	1	8.8	8.2	1	6.0	2.1	-	-	-
	Full ripeness	1	6.8	5.0	1	2.3	15.3	1	3.7	10.0	1	2.1	1.1	1	4.3	0.9
Cluj 722	Three leaves	1	10.1	3.8	-	-	-	1	11.0	9.1	-	-	-	-	-	-
	Stem extension	1	13.8	6.3	1	13.6	22.8	1	11.5	10.7	-	-	-	-	-	-
	Earing	1	8.3	6.3	1	8.5	21.7	1	14.8	13.0	1	6.3	4.1	-	-	-
	Milk ripeness	1	8.8	6.9	1	7.4	11.9	1	5.0	8.5	1	6.1	2.3	-	-	-
	Full ripeness	1	9.7	10.0	1	4.0	17.0	1	4.0	13.0	1	3.5	2.6	1	4.3	1.1
Harrach	Three leaves	1	5.8	2.0	-	-	-	1	8.8	8.7	-	-	-	-	-	-
	Stem extension	1	7.6	5.3	1	10.2	19.0	1	11.5	12.1	-	-	-	-	-	-
	Earing	1	5.6	4.5	1	5.3	11.7	1	10.0	10.0	1	5.9	3.9	-	-	-
	Milk ripeness	1	5.0	4.1	1	2.8	8.5	1	10.0	8.5	1	6.2	2.2	-	-	-
	Full ripeness	1	7.5	5.0	1	2.7	24.7	1	3.6	10.4	1	2.9	2.7	1	4.6	1.1

There were noticed differences between varieties, consisting in lower nitrogen contents in the intensive variety as measured against the extensive one, in the root, fact that contributed to reaching a nitrogen/phosphorus proportion of 5.8/1 in Bezostaia 1 and 10.1/1 in Cluj 722 (tab.2). According to literature data a lower nitrogen/phosphorus proportion in root, the seat of proteic metabolism, diminishes the growing processes in the favour of straw lignification thus contributing to a batter standing power (1).

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