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DYNAMICS OF THE GLUCIDIC CONTENT DURING WINTER DORMANCY IN ONE-YEAR-OLD BRANCHES BELONGING TO SOME ROSE VARIETIES

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Abstract: During the winter season, resistance processes of roses one-year-old woody branches against unfavourable features were been noticed with some consumption of plastic substances (glucids). The ' ' of all these in the roses wooden branches were correlated with the stress features.
Although, in the same time with the winter dormancy period, the total glucids content are decreased. In the spring season, it start to improve this glucidic content which became the starting reserve for the buds, and soluble glucids are translocated inside of the branches from basis toward the peak; and, in periods with favourable temperatures, the monoglucids are polimerizated.

Key words: glucidic content, one-year-old, rose branches.

One of the directions that calls the attention of both researchers and practitioners that "serve" the vegetal world is to "decipher" the physiological, biochemical bases of different behaviours of plants in given conditions. During our observations we registered the correlation between the level of the glucidic reserves in the one-year-old branch and its resistance to the negative temperatures during winter and the finding of the physiological bases of cuttings in rose.

Material and methods

The biological material studied is represented by one-year-old branches of noble rose belonging to 'Grand Prix' and 'M[me] Meilland' varieties from Iaşi Botanical Garden collection, varieties appreciated as meanly resistant to negative temperatures [3].

The branches were cut at the level of the node on the two-year-old branch and divided into 3 sections: base, middle, peak, fractions that were grinded and dried in the drying store for 30 minutes at a temperature of 105°C.

After drying there was determined gravimetrically the dry matter content, the results being expressed in g and the glucidic content using Bertrand method modified by Borel, the results being expressed in g glucose per 100 g dry matter.

The observations were done during winter months (November-February, inclusively)

Based on the obtained data there were made cumulative tables and there were drawn the corresponding diagrams.

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Results and discussions

Our observations emphasize the fact that, during winter although the wooden plants (bushes in our case) are dormant, inside them there take place permanent changes of a metabolical order, aspect that is remarked in the observations carried on by the relation between the glucidic fractions that are permanently changing (diagrams 2-5).

The total glucides content

a) Decreases gradually during the studied period, that underlines the fact that the maintenance of the plant within limits compatible with life under the action of low negative temperatures is made by consuming reserve matter;

b) Frost resistance of one-year-old branches isn't given only by the glucidic matters in the plant, but also by the mixtures between glucides and fatty matters such as vegetal oils, that seemed to be the real cryoprotective matters [4], fact emphasized by us through qualitative reactions as a consequence of the observations that after the thermal stress periods a part of insoluble polyglucides reserves are recovering.

c) There is noticed concentration of the total glucides towards the peak of the branch, that emphasizes the plant tendency to protect its peak buds that are the most active [6].

The quantitative variations of insoluble and soluble glucides

They are indicating the direction of the above-described processes, emphasizing the fact that during the low/negative temperatures periods, the insoluble polyglucides are dividing further up to dioses and monoses.

The active glucides content (mono- and disaccharides)

a) During the thermal stress periods there was noticed an increase of the content of mono- and disaccharides probably in order to concentrate in the cellular juice that gives a resistance of the cytoplasm to low negative temperatures.

b) During the periods having temperatures close and above biologic zero, in rose (+ 5°C) we noticed that they are maintained at quasiconstant levels or at quasilow ones because when accumulated in the cells' protoplasm, they could determine an increase of the osmotic pressure.

Water/dry matter content

Is the index that determines the essential feature of protoplasm organisation (= cytoplasm) and ranges according to the tissue.

There were noticed differences concerning the water content in the 2 varieties studied, the 'Grand Prix' variety having a higher water content, especially towards the peak.

Regarding the varieties studied, 'Grand Prix' and 'M^{me} Meilland', there are noticed quantitative differences correlated to the qualitative difference that resides in the fact that 'Grand Prix' variety is more resistant to frost than 'M^{me} Meilland' variety where the quantitative values in reserve matters are, generally, smaller than in 'Grand Prix' variety.

Conclusions

1. The difference in reserve matters, in a positive sense for 'Grand Prix' variety face to 'M^me^ Meilland', illustrates the positive correlation between reserve matters and resistance to frost.

2. Polysaccharides content is higher in 'Grand Prix' variety than in 'M^me^ Meilland' variety (the positive difference is over 4,8 g/100 g dry matter) and is maintaining all over the observations period.

3. 'Grand Prix' variety has the tendency to keep higher quantities of water within the wooden branches, face to 'M^me^ Meilland' variety.

4. From 1, 2 and 3 there result that the defence mechanisms at low negative temperatures differ according to variety.

5. The resistance to unfavourable temperatures "costs" reserve matter.

6. The plant has a tendency to defend very much the peak of the branch, resulting the opportunity of doing ease cuttings in autumn.

References

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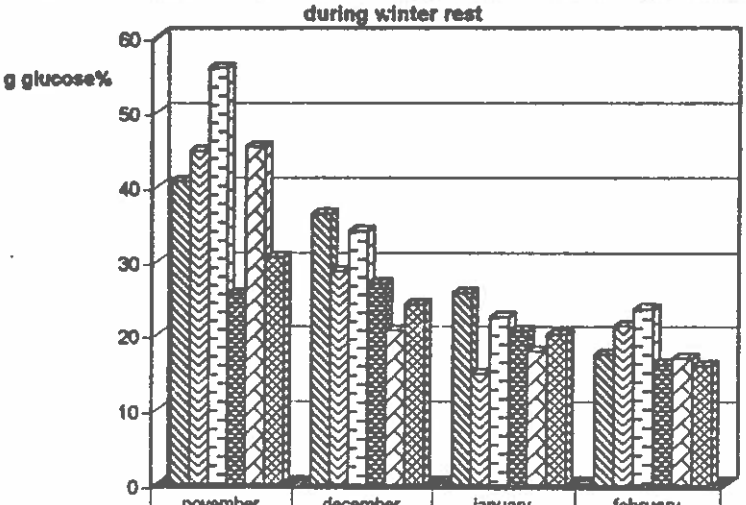
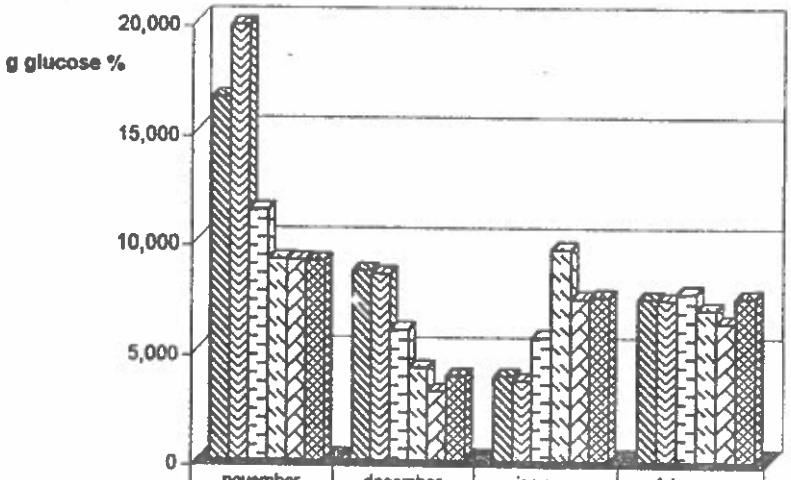
Fig. 1 - Quantitative variatiaon of total glucides content in rose varieties during winter rest



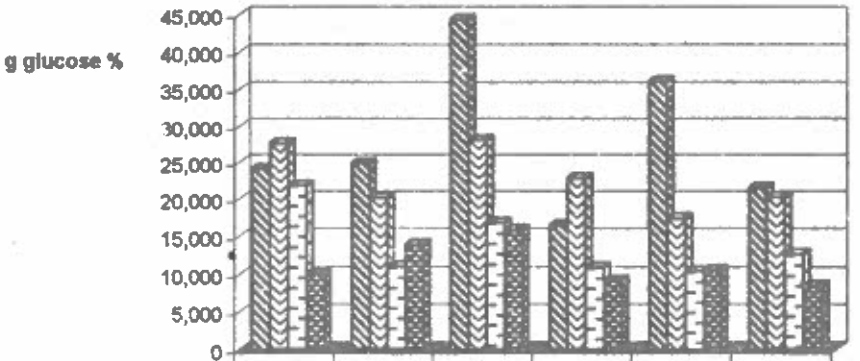
	november	december	january	february
GPb.	40.629	36.287	25.739	17.425
GPm.	44.706	28.686	14.756	21.267
GPp	55.835	34.056	22.454	23.55
MMb.	25.64	27.05	20.568	16.144
MMm.	45.263	20.596	17.802	16.899
MMp	30.542	24.164	20.145	15.899

Fig. 2 - Quantitative variation of insoluble glucides in rose varieties during winter rest



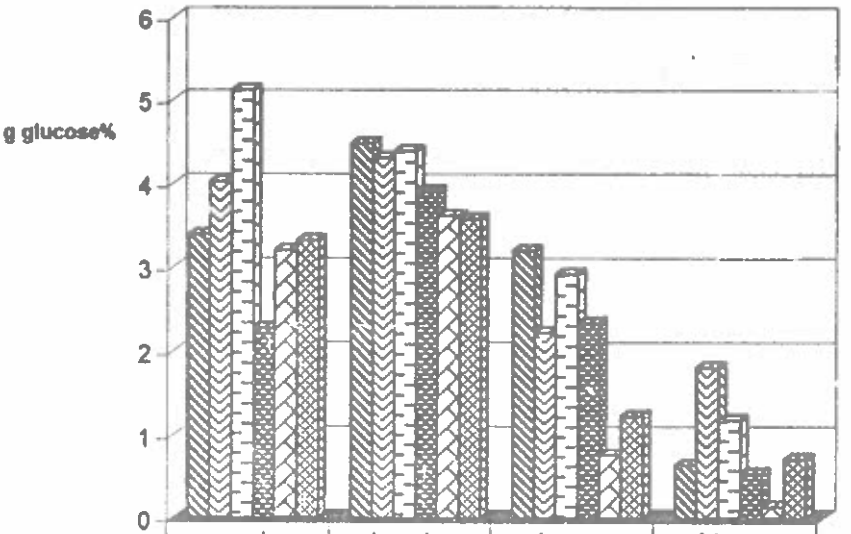
	november	december	january	february
GPb	16,501	8,614	3,847	7,360
GPm	19,795	8,457	3,655	7,268
GPp	11,424	5,932	5,596	7,616
MMb	9,137	4,222	9,622	6,873
MMm	9,093	3,167	7,349	6,274
MMp	9,062	3,858	7,431	7,401

Fig. 3 - Quantitative variation of soluble glucides in rose varieties during winter rest



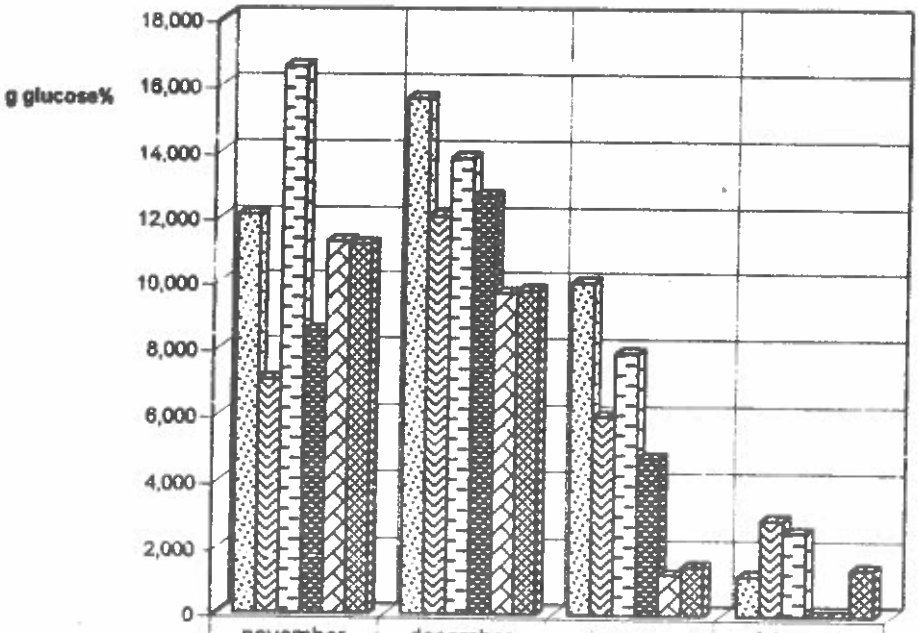
	GPb	GPm	GPp	MMb	MMm	MMp
november	24,127	24,905	44,410	16,503	36,169	21,480
december	27,672	20,228	28,124	22,826	17,429	20,304
january	21,890	11,101	16,858	10,946	10,452	12,713
february	10,063	13,978	15,932	9,270	10,624	8,497

Fig. 4 - Quantitative variation of monosaccarides in rose varieties during winter rest



	november	december	january	february
GPb.	3.393	4.473	3.201	0.651
GPm.	4.02	4.305	2.224	1.815
GPp	5.117	4.381	2.923	1.195
MMb.	2.284	3.913	2.34	0.553
MMm.	3.206	3.62	0.77	0.143
MMp	3.323	3.581	1.244	0.722

Fig. 5 - Quantitative variation of disaccharides in rose varieties during winter rest



	november	december	january	february
GPb	12,063	15,582	9,987	1,220
GPm	7,038	12,027	5,956	2,903
GPp	16,518	13,791	7,876	2,535
MMb	8,502	12,636	4,734	1
MMm	11,234	9,653	1,241	0
MMp	11,143	9,740	1,492	1,439