# SEASONAL DYNAMICS OF NITROGENOUS CONTENT ON SOME SEEDLING CULTIVARS OF FRUIT TREES

## DINAMICA CONȚINUTULUI ÎN AZOT LA PUIEȚII UNOR CULTIVARE DE PĂR ŞI PRUN

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**Abstract.** *The accumulation of nitrogen increased during the development of graft combinations in several fruit tree species. A different pattern in nitrogen accumulation was found in the graft point. Concretely, the nitrogen amount decreased from the scion to rootstock. A low degree of graft compatibility was associated to reduced nitrogen content above the graft point*

**Rezumat.** *S-au facut determinari ale continutului in axot total in diferite zone ale tulpinei pe parcursul perioadei de vegetatie la cateva combinatii de pomi altoiti in scopul elucidarii dinamicii acestui parametru prin prisma interactiunii altoi /portaltoii la combinatii cu grad diferit de compatibilitate. S-a constatat o crestere a continutului de azot pe parcursul ciclului anual al pomilor. De asemenea s-au remarcat diferente privind acumularea azotului in zona punctului de altoire la diferite specii studiate.i*

## INTRODUCTION

Nitrogen is mainly present in the nature in the molecular form or as insoluble nitrites, which are not assimilated by plants. In soil, it is bound in soluble salts in a relatively low percentage. In spite of this, it is an important macroelement for plants where it is found mainly (15-19% from the total nitrogen content) in plasmatic proteins. In this way it is used for the generation of cellular constituents or it can be used as component in some physiologically active substances necessary in the energetic processes of the cells. A small nitrogen amount participates to the generation of nitrogen bases, ferments, and vitamins. It also participates to the formation of chlorophyll molecules and in the form of amide it can be used as source of ammonia. In the ionic form it plays an important role in the regulation of pH, osmotic process and in the cellular redox potential. The deficit in nitrogen has a greater impact on photosynthetic processes than other nutritive substances.

## MATERIALS AND METHODS

The biological material used was four two-years old cultivars of fruit trees: pears cultivars Curé and Euras grafted on Cydonia oblonga BN 70, plum cultivar Stanley and apricot cultivar Goldrich, both grafted on Prunus cerasifera.

The seasonal dynamics of nitrogenous compounds were investigated under natural conditions during summer and autumn. The samples are collected among the three shoot zones relative to the graft point: at 2 cm above the graft union, at the grafting point and 2 cm below the graft union point.

The nitrogen content of each of the samples was estimated using the Kjeldahl technique and Kjeltech apparatus as described by Davidson et al (1970)

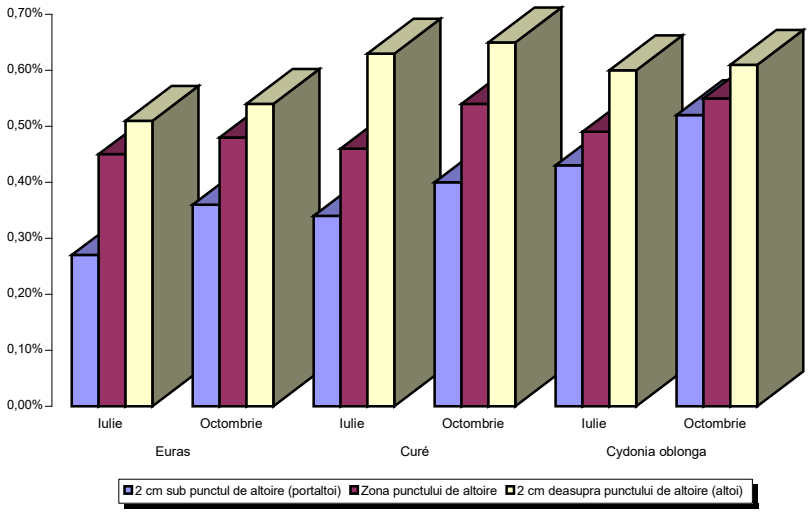
## RESULTS AND DISCUSSIONS

The total nitrogen content during the developmental stages in the Euras and Curé cvs grafted on compatible quince rootstock (*Cydonia oblonga* BN 70) slightly increased (Fig. 1). There were differences in the nitrogen accumulation among the three shoot zones relative to the graft point. The amount of nitrogen in different plant parts was dependent on different phenomena such as:

- the absorption of nitrogen; this occurs in roots and it is ascendant transported to the leaves;
- the metabolic activity; the absorbed nitrogen is used in plant metabolism where it is incorporated in different biologically active compounds, such as proteins, chlorophylls amines etc. They are found in the tissues with an intense metabolic activity (parenchyma).

In compatible combinations, the ascendant flux through the graft union is easily occurring, so that our results indicate that the regeneration of xylem was successful in those species. In the same time, the amount of nitrogen was higher in the grafted plants (at the graft point) than in those (ungrafted) used as control. This can be explained due to the formation of tissues with an intense metabolic activity like callus or medullar parenchyma at the scion/rootstock junction.

**Fig 1. Dinamic and pattern of nitrogen accumulation in pear cultivars Euras and Cure grafted on *Cydonia oblonga* BN 70**



The plants grafted on *Prunus cerasifera* presented higher oscillations in the nitrogen amount although there was found a similar pattern of changes. In addition, for the Goldrich cv, the amount of nitrogen is lower above the graft union point than that detected to the Stanley cv or to control. The Goldrich/*Punus cerasifera* combination has a lower degree of compatibility meaning that the regeneration of phloem and xylem was made to a lower extent than for other combinations. This could induce a blockage in the sap ascendant flux at the graft union point leading to the accumulation of nitrogen compounds in this point.

**Fig 2. Dinamic and pattern of nitrogen accumulation in Goldrich and Stanley cvs. grafted on *Prunus cerasifera***

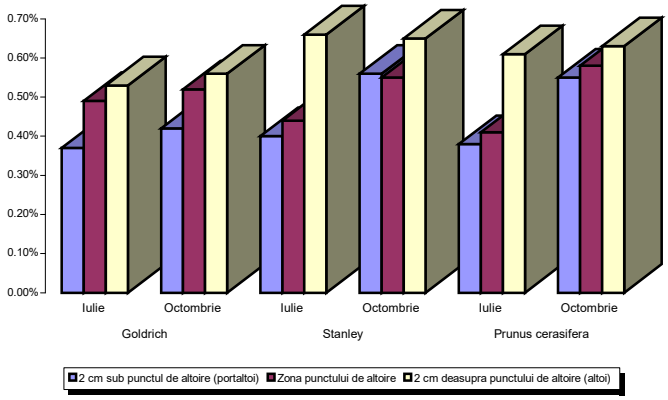
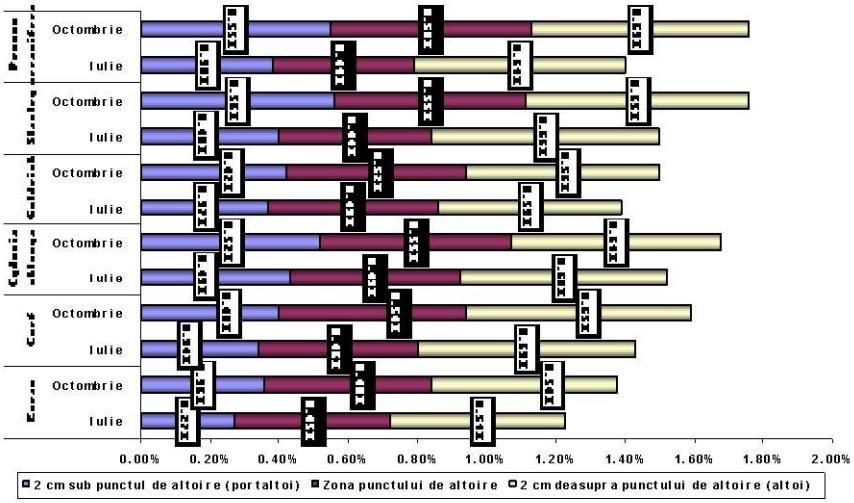



**Fig. 3 The dinamic of nitrogen accumulation in the summer-autumn season in Euras, Cure, Goldrich, Stanlei cvs. *Cydonia oblonga* BN 70 and *Prunus cerasifera***



Concerning the dynamics of nitrogen accumulation during the plant development we found significant differences between the investigated species. The lower oscillations were found for the *Prunus armeniaca* cv Goldrich fact that could be correlated with the low metabolic activity of this species in this period of the annual cycle, being well known the fact that this species has a earlier recumbence period as the other species.

## CONCLUSIONS

1. The nitrogen amount increased during the developmental stages at all investigated species.
2. The accumulation of nitrogen during the developmental stage registered highly variations, excepting the Goldrich cv where the dynamics of nitrogen accumulations was the most insignificant.
3. A different pattern of nitrogen accumulation was found in shoots where the highest nitrogen accumulation was registered above the graft union point, medium accumulation at the graft point and minimum accumulation below the graft union point.
4. A reduction in the nitrogen content was found above the graft union point at the Goldrich cv as compared to other species due to the low degree of compatibility of this graft combination.

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