Abstract

In this work we have done a research study about the annual variation in production of photoassimilates and mobilizing them into sinks in the alternate bearing 'Salustiana' sweet orange (*Citrus sinensis* (L.) Osb.), and its relation to the reproductive behavior. The alternate bearing of this variety is due to the low intensity of flowering obtained after a year of a high yield, and not to the decreased of fruit set. The photosynthetic rate does not show major seasonal variations, being the changing environmental conditions among the different days in a month the main source of variation. No significant differences were observed in A_N among trees *on* and *off*, although in the same *on* tree, the leaves of shoots that bear fruits have a slightly lower photosynthetic rate (10%) than shoots without fruit. The photosynthetic capacity remains stable throughout the first year of life of the leave, and decreases by 20% for the second-one. Soluble sugars in leaves of 'Salustiana' maintain a fairly constant level throughout the year, whereas the excess of fixed carbon is used for the production of starch, which is the carbohydrate with greater variations. The variation in carbohydrates meets the changing demand of the various sinks. In *off* trees, the starch content is higher than in *on* trees between March and August, and the maximum difference occurs at the end of fruit drop, in June. From September until March, no differences in carbohydrate content among trees *on* and *off* are observed. At the time of full blossom (April), the concentration of carbohydrates in *on* tree leaves decreases dramatically. Most of the stocks during the *off* year seem destined to the formation of surplus flowers, with a cost of dry matter of about 6 kg. From these observations it can be concluded that the reserves of carbohydrates in leaves do not have a regulatory role in the floral induction which takes place between November and February, also in flower development, which starts between February and March. Ringing in June causes an increase of carbohydrates in *off* trees, but not in *on* trees, mainly in soluble sugars, and a higher percentage of vegetative shoots is observed, although not in the case of reproductive shoots. In the *on* trees this treatment has no effect. Ringing treatment in early September increases reducing sugars and increases flowering in the upcoming spring in about 50 flowers per 100 nodes, regardless of the fruit load. When ringed is done in October and November, there is only an increase in the accumulation of starch and reducing sugars in *off* trees, but does not cause a significant increase in

flowering. However, 'Owari' satsuma mandarin (*Citrus unshiu* Marc.) shows that the increase in carbohydrates (starch and non-reducing sugars) and the increase in sprouting and flowering is obtained when ringing treatment takes place in November. These results suggest that there is a period of acquisition of competence to flower, prior to the floral induction, which is sensitive to sugar content, and that in the case of the 'Salustiana' sweet orange would end before October, whereas in satsuma mandarin would have a higher duration. The content of GA_1 in July is ten times higher in shoot tips with fruit notes than in shoot tips unfruitful. Between November and February gibberellins considered as metabolically active are in concentrations less than 0,1 ng g^{-1} (GA_1) or undetectables (GA_4), with no differences observed between shoot tips with and without fruit. Thus, differences in endogenous gibberellins in the floral induction period are not responsible for the alternate bearing. Although, the differences observed in July support the hypothesis of the existence of a period of acquisition competition in tips to be induced to flower afterwards, that would include the period between July and September.