園学研. (Hort. Res. (Japan)) 10 (4) : 551–558. 2011.

ウメ‘南高’の果実および新梢の同化養分競合特性と着果負担が同化養分の転流と樹体生育に及ぼす影響

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Characteristics of Assimilated Carbohydrate Competition between Fruit and Shoot, and Effect of Fruit Load on Assimilted Carbohydrate Translocation and Tree Growth of Japanese Apricot (*Prunus mume* Sieb. et Zucc.) ‘Nanko’

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摘　要

ウメ樹体の同化養分競合特性を明らかにするため, 果実生育期間中（果実肥大第 I, II, III 期）において, 結果枝に ^{13}C を吸収させて各器官中の ^{13}C 含有率および分配率を調査した. また着果負担をさせた樹体全体に ^{13}C を吸収させて, 各器官における ^{13}C 含有率および分配率を測定するとともに樹体生育への影響を調査した. 果実肥大第 I 期では, 新梢の ^{13}C 含有率および分配率が果実に比べて高かった. しかし果実の ^{13}C 分配率が 30%であったことから果実と新梢の間の養分競合は果実生育の早い段階から起こっていることが示された. 果実の ^{13}C 含有率および分配率は第 II 期に最も高かった. 特に核および仁で高かった. この時期における果実の ^{13}C 分配率は 60%と, 新梢の 40%に比べて高かった. 第 III 期では果実の ^{13}C 含有率が減少した. しかし ^{13}C 分配率は 40%を維持していた.

着果負担をかけた樹体では新梢と根の ^{13}C 含有率および分配率ともに着果負担をかけなかった樹体に比べて低かった. 着果負担樹は葉巻き, 黄変, 早期落葉, 徒長枝の発生抑制および枯死枝の増加が認められた.

以上のことから, 果実と新梢の間の養分競合は果実肥大第 II 期に最も著しいことが明らかになった. また着果負担がかかった樹体は新梢および根への同化養分の分配抑制のために樹勢が低下すると考えられた.

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Summary

To determine the characteristics of carbohydrate competition, we investigated changes in ^{13}C concentration and distribution rate in fruit-bearing branches of Japanese Apricot (*Prunus mume* Sieb. et Zucc.) 'Nanko' during fruit growth. We also investigated the effect of heavy crop load on ^{13}C concentration and distribution rate in each organ of the whole tree and on the growth of the tree. In fruit-growth stage I, the ^{13}C concentration and distribution rate in shoots were higher than those in fruits, however, fruits comprised about 30% of the 13C distribution rate. These findings indicated that the carbohydrate competition between fruits and shoots exists from the early fruit growth stage. The ^{13}C concentration and distribution rate in fruits was the highest in all organs during stage II. Especially, the ^{13}C concentrations in the stone and kernel of the fruit showed significantly higher values. During this stage, the carbohydrate distribution rate in fruit was about 60% and higher than that in shoots at about 40%. In fruit-growth stage III, the ^{13}C concentration in fruit declined in comparison in that in stage II; however, the ^{13}C distribution rate remained about 40%. The ^{13}C concentration in shoots and roots of trees with a heavy fruit load were lower than those of trees with a normal fruit load, and the carbohydrate distribution rates in the former were also lower than those of the latter. A tree with a heavy fruit load showed leaf rolling and etiolation, earlier defoliation, restraint of emerging vigorous shoots, and an increase in dead twigs. In conclusion, it was clear that the carbohydrate competition between shoots and fruit is most significant during fruit-growth stage II. It was thought that trees grown with a heavy fruit load become weaker due to restraint of carbohydrate translocation to shoots and roots.