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Bud and spear development of asparagus under constant temperature

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ABSTRACT

Objectives of our study were to quantify the effects of apical dominance and bud cluster activity on asparagus yield patterns and to collect data for process-oriented modeling of the asparagus crop. Plants were grown in 40 L containers. After four years the soil above the asparagus crowns was removed and the containers were placed in a growth chamber at 20° C for three months. During this time, spear length was measured daily except at weekends, and spears were cut when longer than 25 cm. Each spear was assigned to a bud cluster, defined as a dense group of buds clearly distinct from other bud groups on the crown. Although temperature was constant, several properties measured in this study changed during the experiment. The number of active bud clusters first increased then decreased, the lag time between spears growing at the same cluster increased, and the relative growth rate of spears decreased. The constant increase of harvested spears per plant stopped abruptly when the plants ran out of viable buds. At the crop level, *i.e.* the average for all plants, which is normally monitored in field trials, the transition from linear yield increase to zero increase was less abrupt since plants stopped growing spears on different dates. In our study asparagus yield, *i.e.* the number of harvested spears, was not limited by low carbohydrate in storage roots, but by a lack of viable buds. This was concluded from the abrupt halt in spear production observed in all plants despite the fact that some plants still had considerable carbohydrate content.

KEYWORDS

Asparagus Officinalis; Model; Yield; Physiology; " Backlim" ; " Gijnlim"

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