Project title: Bioregulators for management of vegetative growth and fruit quality in pear

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Accomplishments:
Nineteen trials with bioregulators were established on pear trees between 1999 and 2001; all trials were located in grower orchards. Most of these trials were designed to evaluate the growth, flowering and fruiting responses of vigorous pear trees to various strategies for timing and concentration of Apogee application to entire trees or to the tops of mature trees. Other trials examined the potential of Apogee to affect harvest maturity and quality of ‘Bartlett’ pear and the effects of cytokinins and gibberellic acid on pear fruit size and shape.

Results:
- Apogee applications in spring reduced vegetative growth temporarily but often resulted in production of a second flush of growth.
- Control of this second growth flush with Apogee is costly and difficult.
- Apogee could induce a second growth flush with as few as a single spring application.
- In rare cases, the vigor of the second growth flush exceeded that of untreated trees.
- When pears make a second growth flush, additional lateral shoots may be produced in addition to any renewed extension of previously active shoot tips.
- Apogee can be used on young, vigorous pear trees to induce a second growth flush and thereby increase the production of weaker lateral branches, which can be retained in the canopy architecture to provide sites for fruiting.
- On young, vigorous pear trees of the cultivars ‘Starkrimson’ and ‘Anjou’, successful induction of a second growth flush with Apogee can result in more shoot growth than in untreated trees but with more of that shoot growth in a larger number of weaker shoots that are more desirable for canopy formation.
- Apogee has been applied successfully to control vigorous shoot growth in the tops of mature ‘Anjou’ and ‘Bartlett’ pear trees.
- Where Apogee reduced vegetative vigor in the tops of mature trees, the amount of pruning required to remove unwanted vegetative growth was substantially reduced.
- Apogee did not improve flowering in ‘Bartlett’ or ‘Anjou’ pear the next year regardless of its effect on vegetative vigor in the year of treatment.
- Apogee reduced the return bloom in ‘Bosc’ pear, regardless of whether the trees had already begun cropping or were initiating flowers for the first time.
- Spring-applied Apogee consistently reduced pear fruit size at harvest.
- The reduction in pear fruit size at harvest did not result from any change in fruit set on Apogee-treated trees nor did it involve any change in fruit shape.
- Apogee-induced reduction in pear fruit size appeared to depend on the number of applications and the concentration of Apogee in sprays applied during the first four weeks after bloom.
- Increased number of Apogee applications and/or higher Apogee concentrations appeared to have a greater effect on reducing fruit size.
- Spring Apogee treatment had no effect on the harvest or postharvest behavior of ‘Anjou’ pear.
• Spring Apogee treatments were inconsistent in their effects on ‘Bartlett’ pear maturity and postharvest behavior, thus not representing an effective option for ‘Bartlett’ harvest scheduling or postharvest management.

• Cytokinin and gibberellic acid applications were unsuccessful in increasing pear fruit size over untreated fruit but did increase the length/diameter ratio of treated ‘Anjou’ fruit to the point of being unrecognizable, not an advantage for marketing.

• Apogee did not produce interactive effects with rootstock on shoot growth, flowering or fruiting phenomena in pear trees.

Summary:
Apogee produced a number of growth-based responses in pear trees, but many of those responses were not deemed to be useful by the labeling company, BASF. As a result of findings produced by this project and other findings as well, BASF removed the registration for Apogee on pears in late 2001.