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Fruit Thinning

To thin, or not to thin...

The decision to thin an orchard hard, little of not at all, has to be made by the grower and his consultant. This expert judgement is based on field information as: cultivar and age, previous years crop, number of flowers, growth and leaf quality, flowering conditions, initial fruit set, and previous experiences in this orchard.

When to thin

After the thinning strategy is decided, the DSS can help to find the best moments to apply the chosen thinning agents. The DSS implements our practical and scientific experience in fruit tinning, and applies this experience in real time using local weather data and weather forecast. The resulting 'expected thinning effect ' is the best forecasts for thinning effects, but not a guarantee.

Flowerthinning: Flowers, pollination, germtube growth, fertilisation

From start of bloom, the model opens a new cohort of flowers every day. For each cohort the pollination and temperature dependent germ tube growth and fertilization is followed. When the user decides enough flower cohorts have been successfully fertilized, he/she can start the ATS or lime sulfur applications to eliminate the later flowers.

The relation between gemtube growth, lifespan of the ovules, and temperature is interpreted form published data.

Fruitthinning: The effect of post-application temperature

The competition between developing fruits and shoots is most critical when the average fruit diameter is 10 to 15 mm.

Early stage fruits growth is depending on temperature. The growth curve that is used by the model is based on the average for several apple cultivars, and for pear on data for Conference.

The temperature after application affects uptake and chemical activity of thinning materials, and the reaction of the plant.

When the temperature in the days after the application stays below 18 °C. the thinning result is insufficient. Normal thinning efficacy can be expected when the temperature reaches 20 to 25 °C. Risk for over-thinning arises when temperatures reach over 30 °C.

The DSS corrects the expected thinning result for the heat sum in the days after application.

The weather forecast reaches 7-10 days. For the simulation of post-application carbonbalance and heatsum in the last days of the forecast, the following days are assumed to have a similar weather pattern.

Fruit Thinning: Carbon balance

Within the period of susceptible fruit size, trees are easier to thin when there is a shortage of carbohydrates.

The DSS simulates photosynthesis and respiration (green and red in the lower graph), and corrects the fruit-size based curve for thinning efficacy for the availability of carbohydrates in the days before and after application of the thinning agent.

The weather forecast reaches 7-10 days. For the simulation of post-application carbonbalance and heatsum in the last days of the forecast, the following days are assumed to have a similar weather pattern.

Photosynthesis and respiration

Photosynthesis and respiration are simulated in 30-minute interval based on radiation, temperature and humidity.