



Apple fruit size management by thinning: when and how much?



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- Thinning is the most difficult, most important, but necessary practice.
- Grower must perform thinning each year.
- Making a mistake will compromise both this year's crop and next year's crop.

Thinning goals

- To enhance fruit quality in the current season
- To achieve regular bearing of apple trees

Main factors affecting fruit size

- Crop load level
- Thinning time

- Adjusting thinning time and regulating crop load level lead to the same target
- At early thinning (pink bud – full bloom) higher crop load level can be maintained, and higher yield can be achieved without compromising with return bloom.

Thinning time

- Impact on fruit size
- Impact on the final yield
- Impact on return bloom

Crop load level

- Impact on fruit size
- Impact on the final yield
- Impact on return bloom

Interaction of both factors

Cultivar genetics

Different crop load management strategies for every type of cultivar!

Three types of cultivars regarding bearing:

- biennial bearing (Elstar, Summerred, Fryd, Eden etc)
- regular bearing (Rubinola, Gravenstein, Gala etc)
- intermediate, which is easier to maintain in regular fruiting mode (Aroma, Rubinstep etc).

Two types of cultivars regarding fruit size:

- large fruited
- small fruited

Fruit development stages and impact on fruit size

Why thinning time is important for fruit size?

- **Cell division.** Higher cell number - bigger final fruit size.
 - Create optimal conditions up to 1 – 1.5 month after flowering.
 - Thin within this window to get better supply for the fruitlets left.
 - Fertilise to support fruitlet growth.
- **Cell expansion.** Fruit size increases due to cell enlargement.
 - Thinning at this stage (after June drop) has less impact on fruit size than thinning earlier.
 - Optimal irrigation and fertilisation.

Cultivar genetics and thinning time

- **Full bloom** - positive effect on fruit size and return bloom for all types of cultivars
- **8-12 mm fruitlet stage** - positive effect on fruit size and return bloom for all types of cultivars
- **Up to 20 mm fruitlet stage** - positive effect on fruit size and return bloom of only regular bearing and intermediate type of cultivars
- **Hand thinning after June drop** – some effect on fruit size, little effect on return bloom of biennial bearing cultivars, but positive effect on variability of fruit size and fruit ripening within the tree

Thinning time effect on fruit quality

Trial scheme:

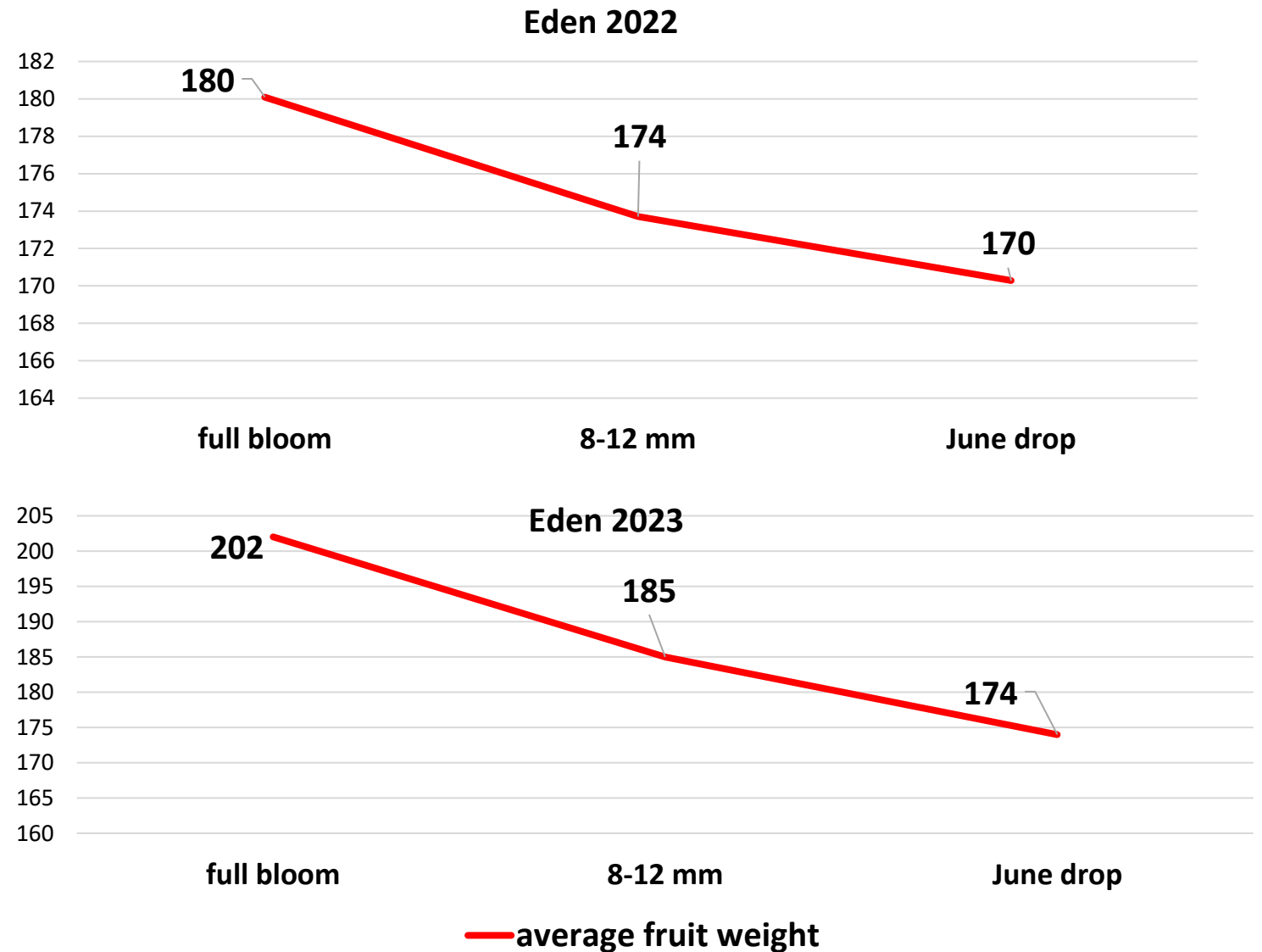
2022 – approx. 35 fruits/tree

2023 – approx. 50 fruits/tree

The early to thin the larger fruits:

2022 only a tendency,

2023 significant differences of fruit weight between all thinning times.



The same crop load
55 fruits/tree at all
thinning times, 2023

Thinning time effect on 'Fryd' fruits



Crop load effects on fruit quality

Thinning to optimal level

- ✓ More even fruit size
- ✓ Less variation of fruit maturity within the tree
- ✓ Higher percentage of fruits harvested during the first pick
- ✓ Better internal fruit quality

Thinning to optimal crop load level:

- good fruit quality
- good return bloom and yield next year



No thinning/ too high crop load left:

- high yield
- Lower fruit weight
- fruit size variation
- no yield next year



FRYD

2022 average weight 191-194 g at lower and optimal level, but significant decrease at high crop level.

2023 significantly higher in low crop level, followed by optimal.

Significantly lower weight from unthinned trees - only 128 g 2022.

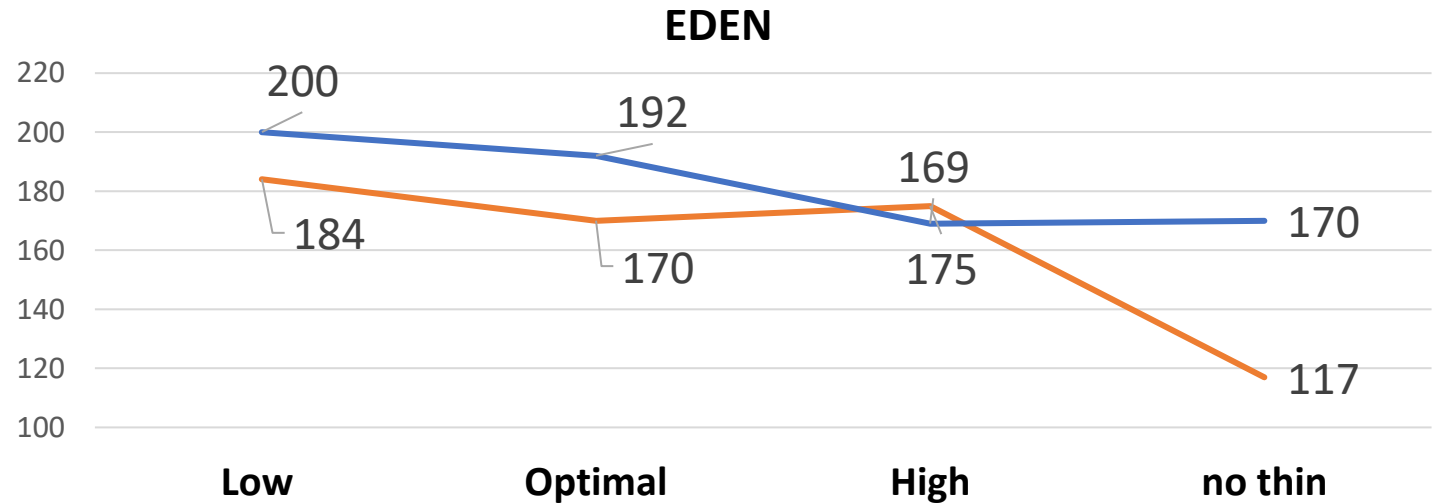
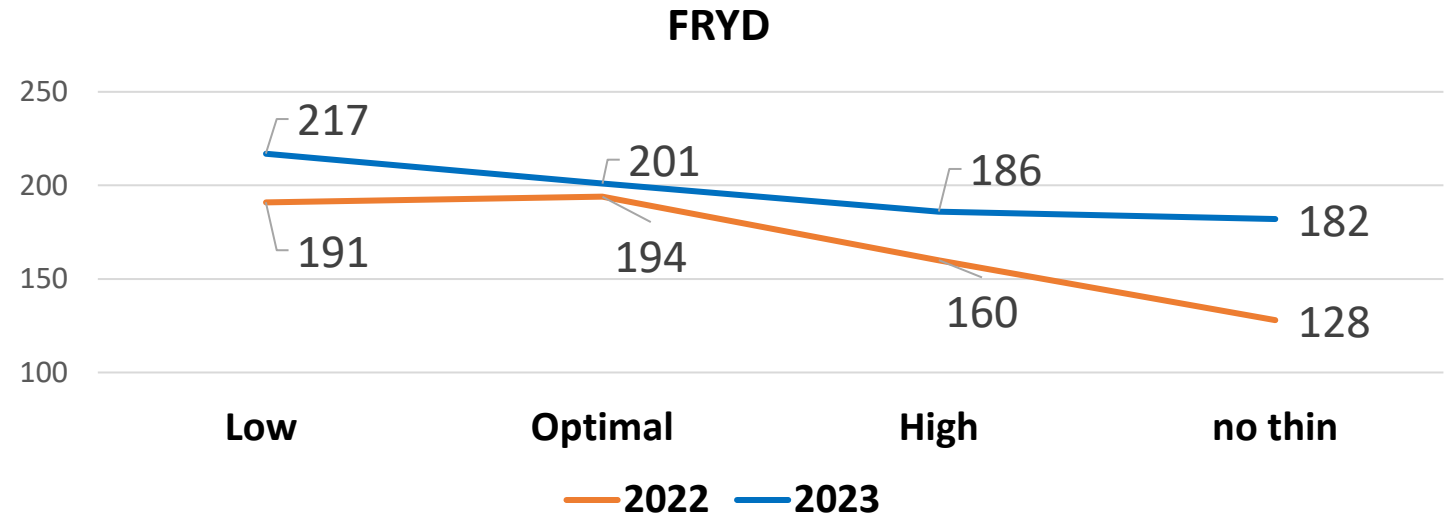
EDEN

2022 average weight 170-184 g in thinning treatments.

2023 significantly higher fruit weight in low and optimal crop levels.

Significantly lower weight from unthinned trees - only 117 g 2022.

Crop load effect on average fruit weight



'Eden' fruits
at different
crop load
levels (2022)



'Fryd' fruits at different crop load levels (2023)



40



55



70



Max 1/1

Strategies for the fruit size regulation

- How to achieve smaller fruit size of large fruited cultivars (regular bearing cultivars)
 - Thin later after cell division stage. Keep higher crop load level.
 - Leave 2 fruits per cluster.
- How to achieve smaller fruit size of large fruited cultivars (biennial bearing cultivars)
 - Early thinning
 - Leave 2 fruits per cluster, but maintain optimal crop load level.
- How to increase fruit size of small fruited cultivars
 - Early thinning
 - More intensive thinning (1 fruit per cluster - larger distances between fruits - fruits only on every second or every third cluster)