BREVIS® in combination

with other thinning compounds

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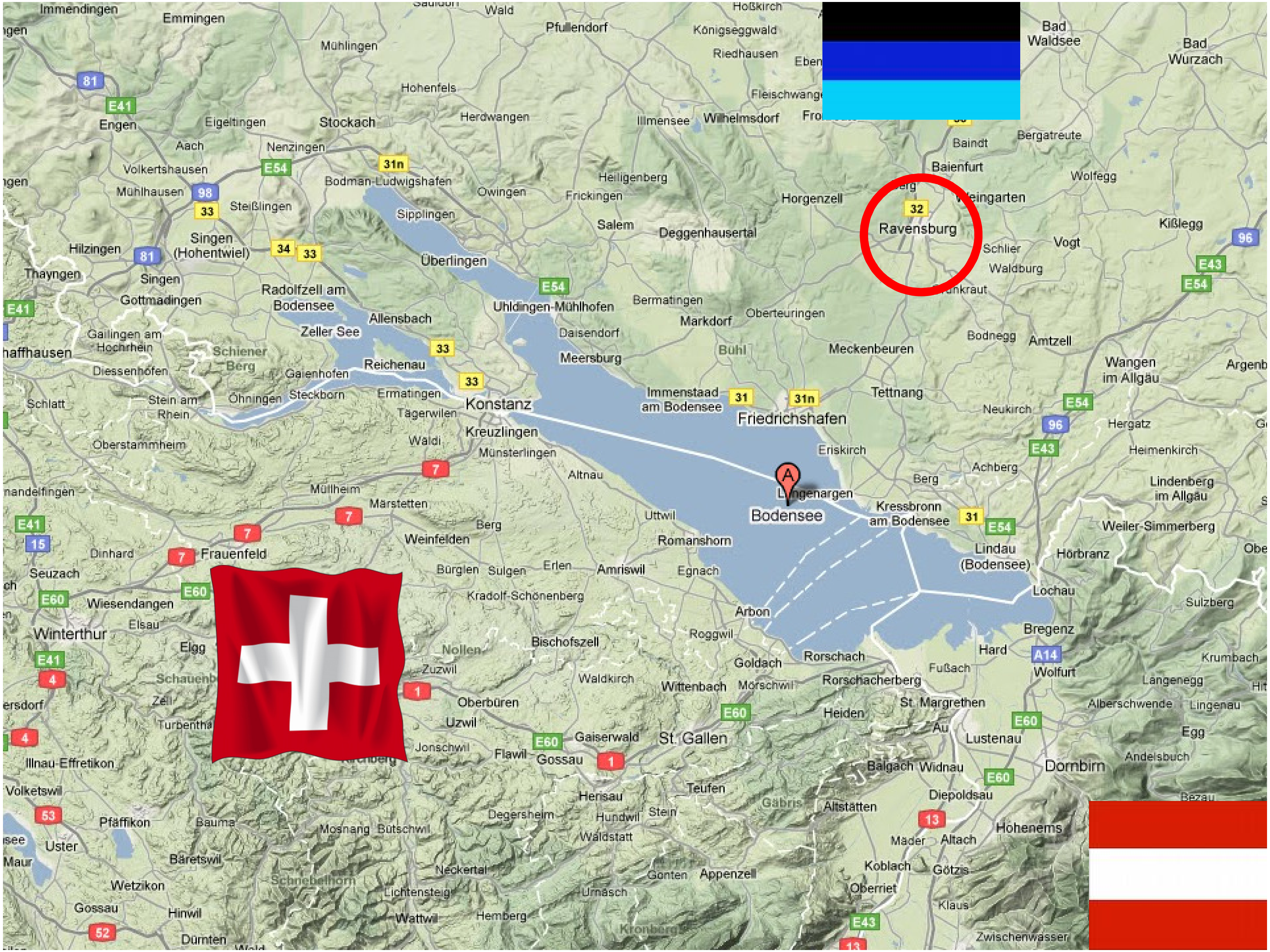
Immendingen
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Volkertshausen
Bodman-Ludwigshafen
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Uhldingen-Mühlhofen
Bermatingen
Allensbach
Markdorf
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Schaffhausen
Schiener Berg
Meersburg
Meckenbeuren
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Diessenhofen
Reichenau
Gaienhofen
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Stein am Rhein
Öhningen
Steckborn
Ermatingen
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Friedrichshafen
Neukirch
Tägerwilen
Kreuzlingen
Hergatz
Oberstammheim
Waldi
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Weiler-Simmerberg
Dinhard
Frauenfeld
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Winterthur
Bischofszell
Roggwil
Bregenz
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Goldach
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Langenegg
Oberbüren
St. Margrethen
Alberschwende
Lingenau
Uzwil
Heiden
Egg
Gaiserwald
St. Gallen
Lustenau
Jonschwil
Flawil
Gossau
Balgach
Widnau
Dornbirn
Andelsbuch
Illnau-Effretikon
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Diepoldsau
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Altstätten
Pfäffikon
Degersheim
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Bütschwil
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Bäretswil
Neckertal
Gonten
Appenzell
Koblach
Götzis
Wetzikon
Schnebelhorn
Lichtensteig
Urnäsch
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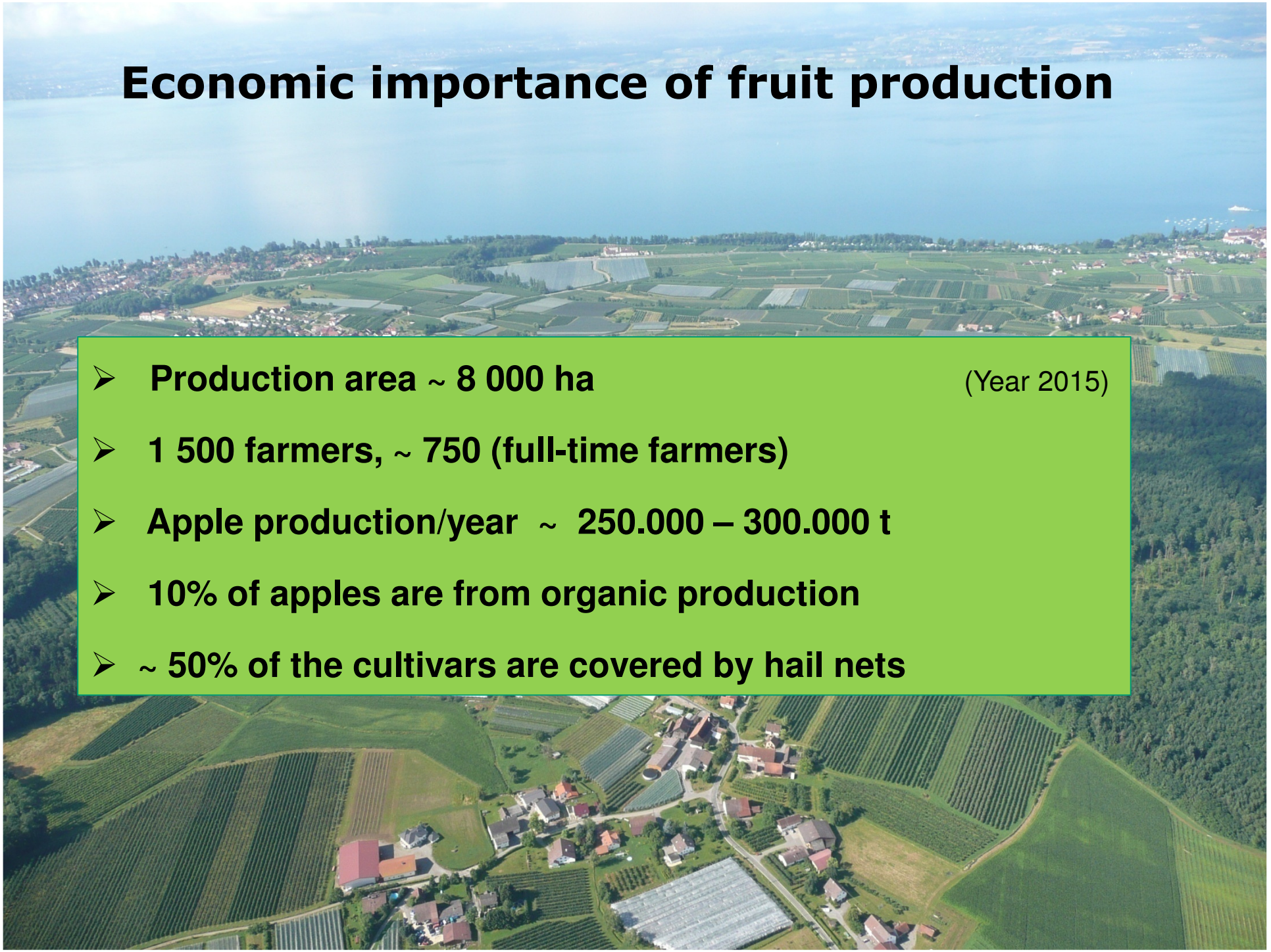
Economic importance of fruit production



- **Production area ~ 8 000 ha** (Year 2015)
- **1 500 farmers, ~ 750 (full-time farmers)**
- **Apple production/year ~ 250.000 – 300.000 t**
- **10% of apples are from organic production**
- **~ 50% of the cultivars are covered by hail nets**

BREVIS® in combination

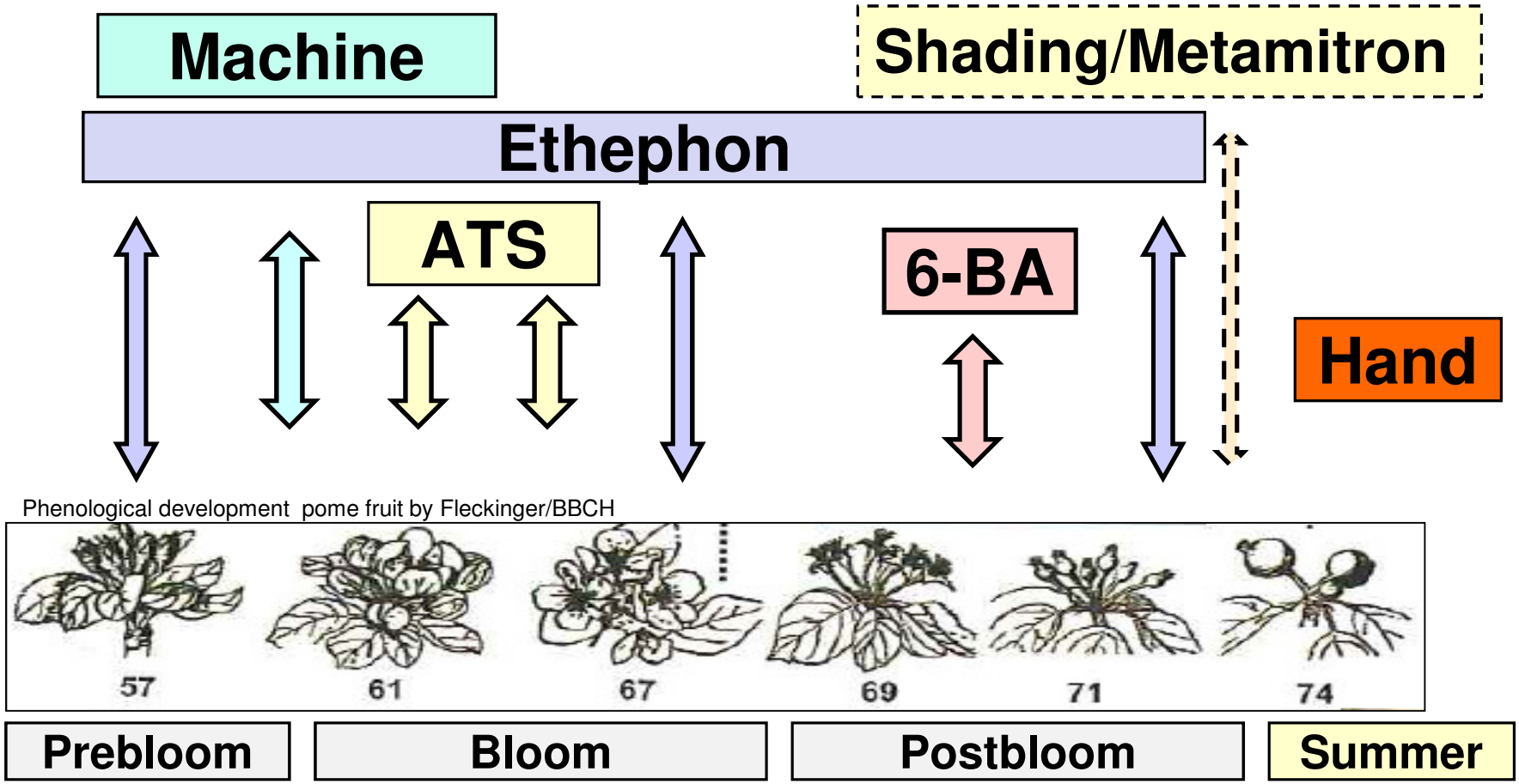
2017: Finally Brevis is now registered in Germany and can be used in the first season

- up to two sprayings
- maximum amount of 2,2 kg/ha per spraying
- in between 6 to 16mm fruitsize
- 2nd treatment 5 to 10 days after 1st spraying

- **Many farmers failed in cropload control during the last years**
- **Many hours and a much money had to be spent for labour costs and handthinning**
- **Alternate bearing, flower bud quality, frost**

BREVIS® in combination

Thinning - Strategy



BREVIS® in combination

- **Combining flower thinning with later fruit thinning (2015+2016)**
- **Improving the thinning efficacy using serveal chemical compounds (2015+2016)**
- **Early mechanical flower thinning with later chemical fruit thinning (2016)**

=> Reaching good efficacy with moderate costs

BREVIS® in combination

- **TREE DARWIN with 250 cm height**
- **ATS product: AGRO N Fluid**
- **6-BA products: Maxcel® Globaryl$_{100}$**
- **Metamitron: Brevis®**

BREVIS® in combination

Trial design:	Cropload control on ‚Pinova Evelina' apples to improve fruit quality	
Planting distance:	3,00 x 0,80 m	planted: 2011

Production space ~ 60% filled, moderate growing, healthy

11 treatments x 4 replications x 5 trees per plot

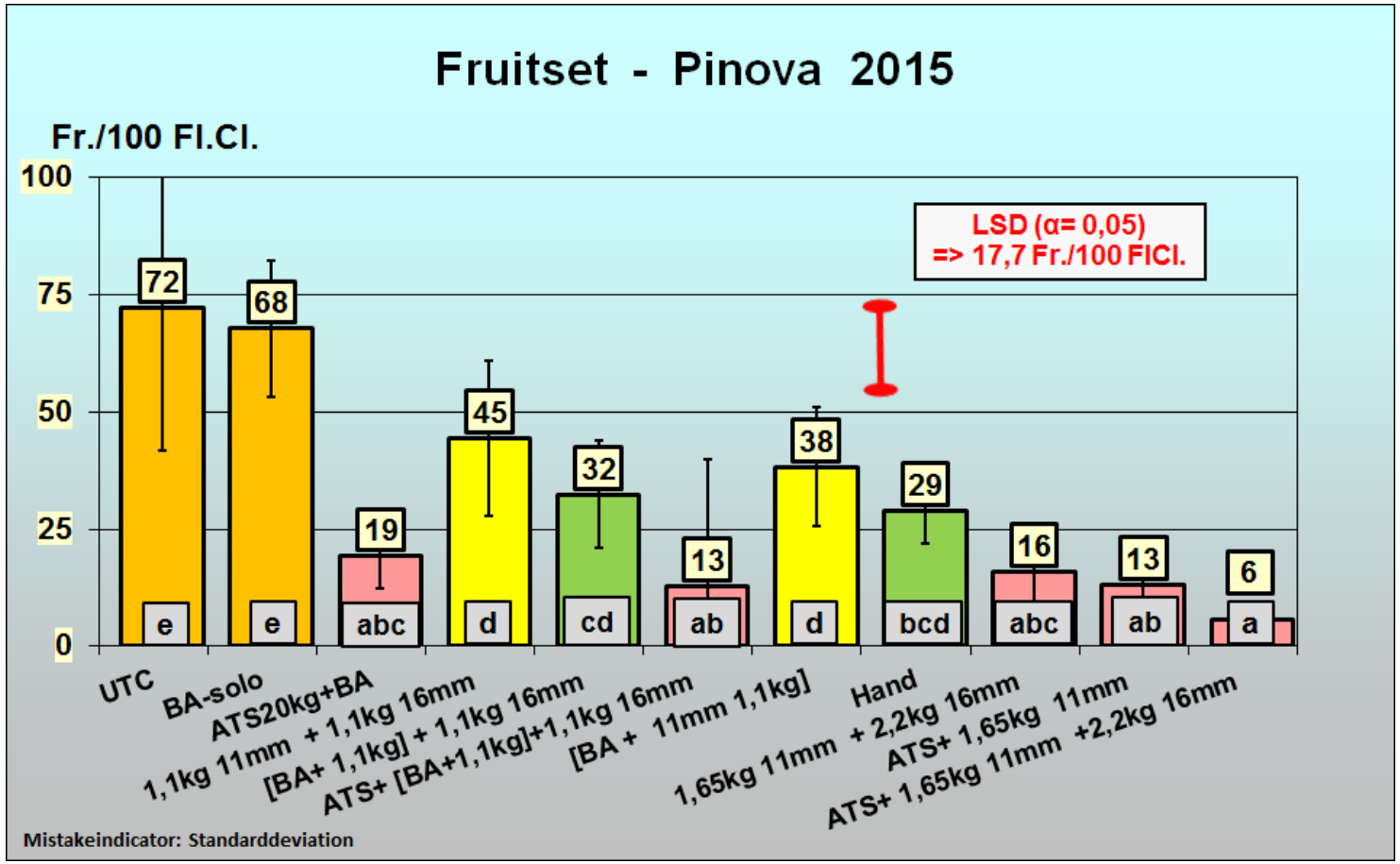
BREVIS® in combination - 2015

VAR	Treatment	Amount g / ml per Hektar	Water	Application
1	UTC	Untreated		
2	a. BA (ProAgro)	a. MaxCel 7,5 l/ha 11 Ø mm beginning warm period	a. 1000 l/ha	1. Date: 18.5.2015 11mm Ø
3	a. ATS b. BA (ProAgro)	a. AGRO N FL. 40L/ha b. MaxCel 7,5 l/ha 11 Ø mm beginning warm period	a. 1000 l/ha b. 1000 l/ha	1. Date: VB 27.4.2015 2. Date: 18.5.2015 11mm Ø
4	a. Brevis 1,1kg/ha **early** b. +Brevis 1,1kg/ha **late**	a. 1,1 kg/ha=165ppm **11mmØ** b. 1,1 kg/ha=165ppm **16mmØ**	a. 1000 l/ha b. 1000 l/ha	1. Date: 18.5.2015 11mmØ 2. Date: 27.5.2015 16mmØ
5	a.[BA (ProAgro) + Brevis 1,1kg/ha **early]** b. +Brevis 1,1kg/ha **late**	a. MaxCel 7,5 l/ha 11 Ø mm + 1,1 kg/ha=165ppm **11mmØ** b. 1,1 kg/ha=165ppm **16mmØ**	a. 1000 l/ha b. 1000 l/ha	1. Date: 18.5.2015 11mmØ 2. Date: 27.5.2015 16mmØ
6	a. ATS b.[BA (ProAgro) + Brevis 1,1kg/ha **early]** c. +Brevis 1,1kg/ha **late**	a. AGRO N FL. 40L/ha b. MaxCel 7,5 l/ha 11 Ø mm + 1,1 kg/ha=165ppm **11mmØ** c. 1,1 kg/ha=165ppm **16mmØ**	a. 1000 l/ha b. 1000 l/ha c. 1000 l/ha	1. Date: VB 27.4.2015 2. Date: 18.5.2015 11mmØ 3. Date: 27.5.2015 16mmØ

BREVIS® in combination - 2015

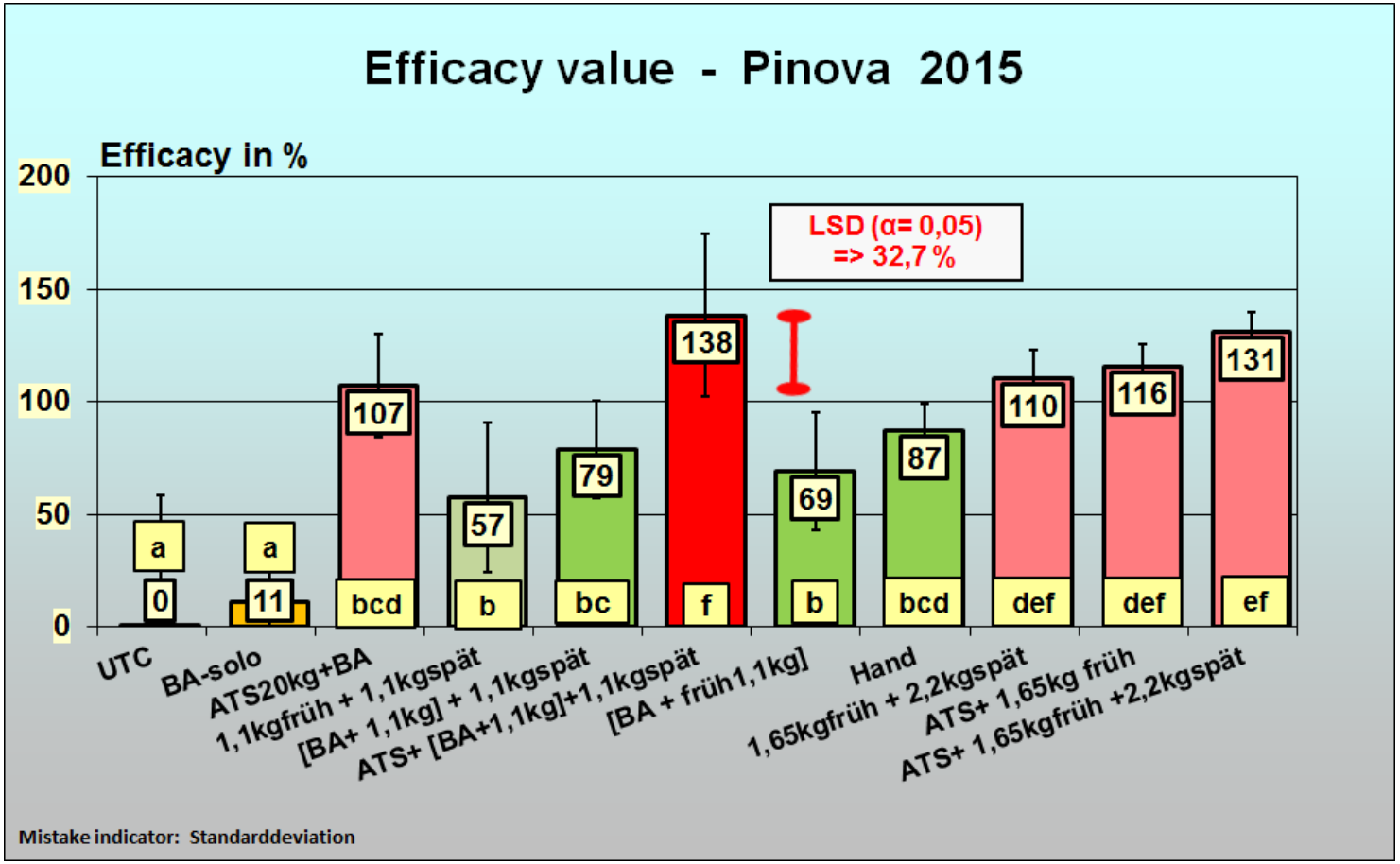
VAR	Treatment	Amount g / ml per Hektar	Water	Application
7	a.[BA (ProAgro) + Brevis 1,1kg/ha **early**]	a. MaxCel 7,5 l/ha 11 Ø mm + 1,1 kg/ha=165ppm **11mmØ**	a. 1000 l/ha	1. Date: 18.5.2015 11mmØ
8	**Handthinning**	Target 62 Fr/Baum ~40 t/ha	-	13 July 2015
9	a. Brevis 1,65kg/ha **early** b. +Brevis 2,2kg/ha **late**	a. 1,65 kg/ha=248ppm **11mmØ** b. 2,2 kg/ha=333ppm **16mmØ**	a. 1000 l/ha b. 1000 l/ha	1. Date: 18.5.2015 11mmØ 2. Date: 27.5.2015 16mmØ
10	a. ATS b. Brevis 1,65kg/ha **early**	a. AGRO N FL. 40L/ha b. 1,65 kg/ha=248ppm **11mmØ**	a. 1000 l/ha b. 1000 l/ha	1. Date: VB 27.4.2015 2. Date: 18.5.2015 11mmØ
11	a. ATS b. Brevis 1,65kg/ha **early** c. +Brevis 2,2kg/ha **late**	a. AGRO N FL. 40L/ha b. 1,65 kg/ha=248ppm **11mmØ** c. 2,2 kg/ha=333ppm **16mmØ**	a. 1000 l/ha b. 1000 l/ha c. 1000 l/ha	1. Date: VB 27.4.2015 2. Date: 18.5.2015 11mmØ 3. Date: 27.5.2015 16mmØ

BREVIS® in combination



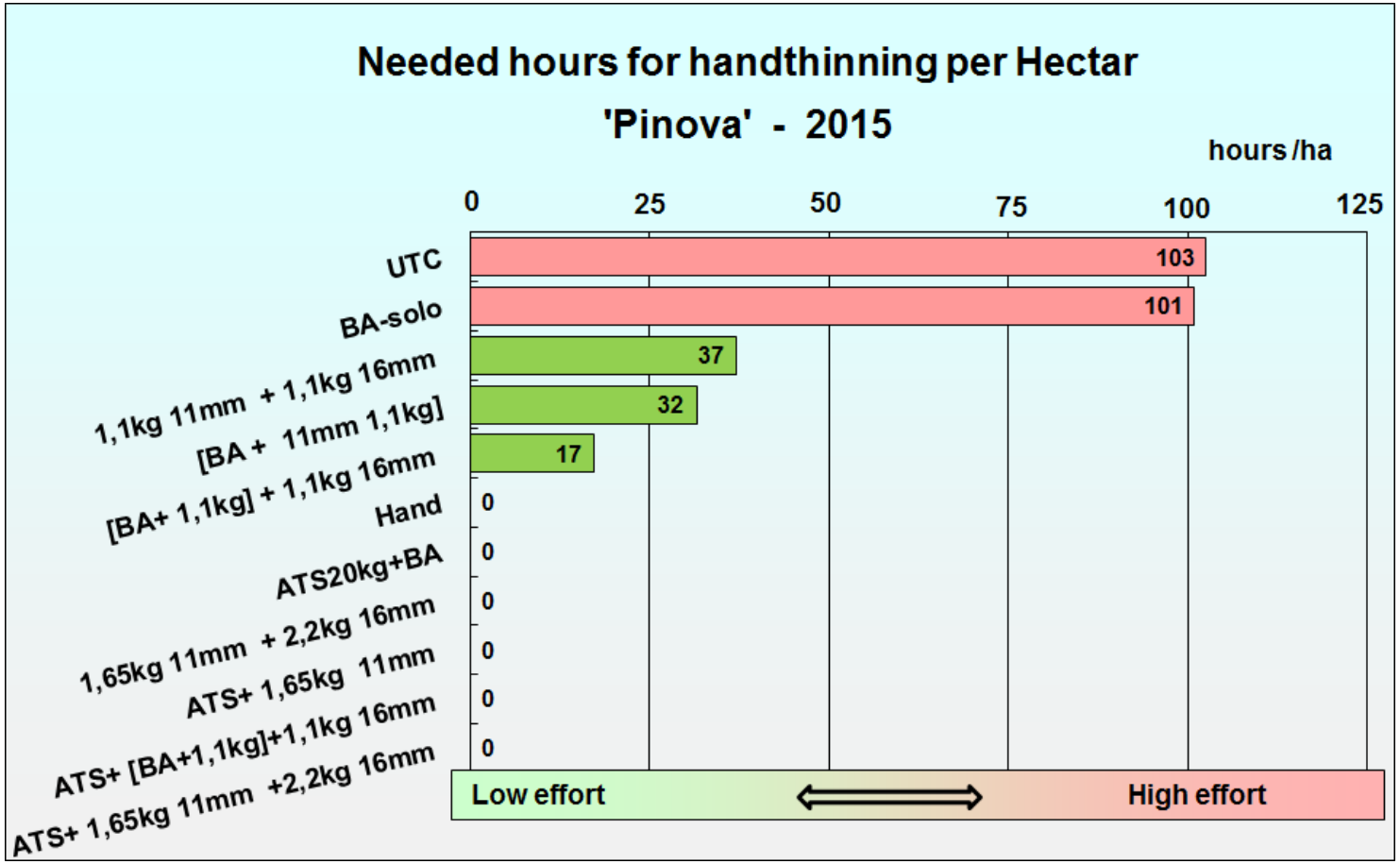
➢ **Next to BA-solo clear decrease in fruitset.**

BREVIS® in combination



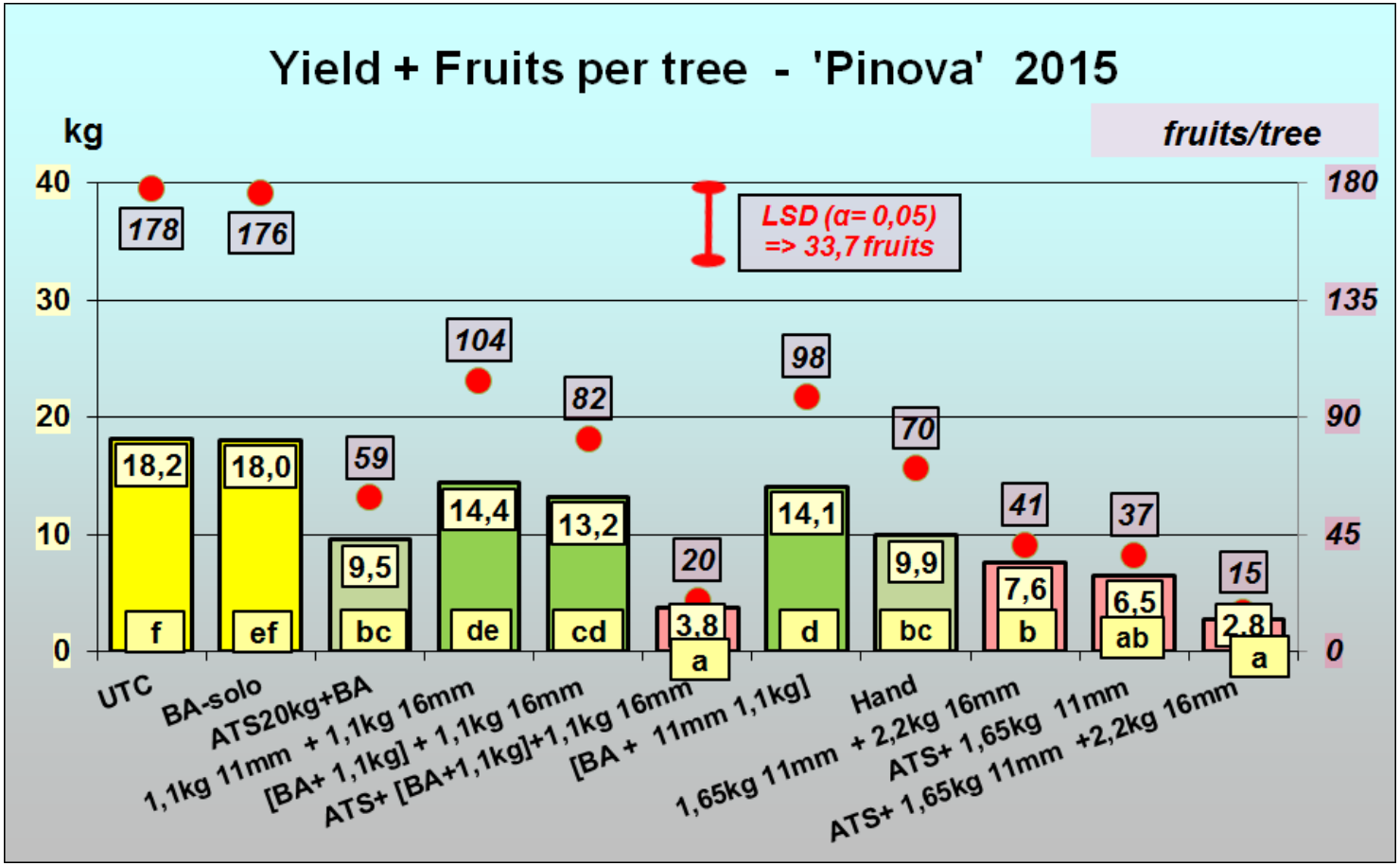
➢ **Good thinning efficacy up to overthinning.**

BREVIS® in combination



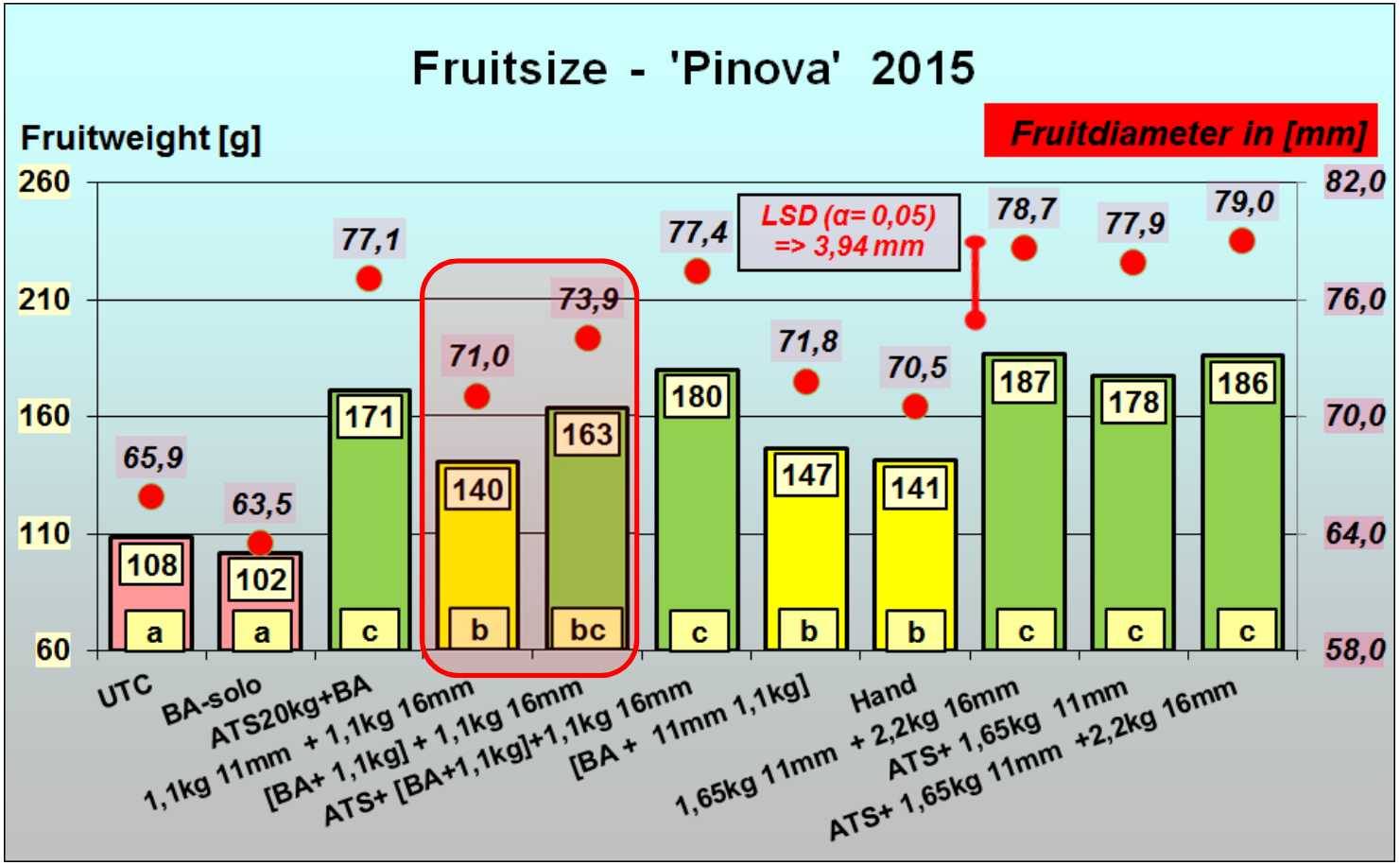
➢ **Low Brevis amounts added with 6-BA positiv.**

BREVIS® in combination



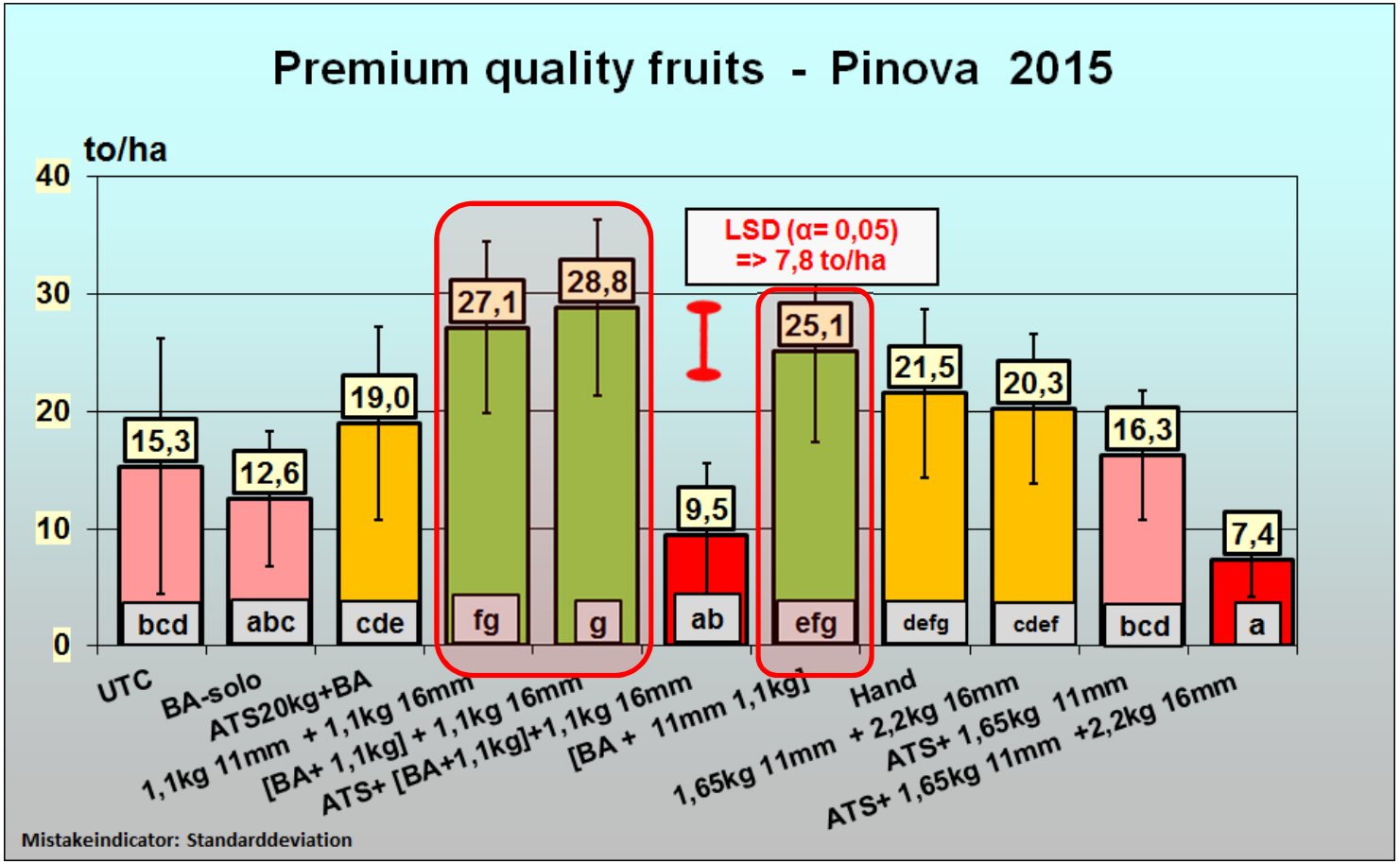
- **10-12 kgs/tree would have been ideal (≈ 65 fruits).**
- **Overthinning with ATS and higher Brevis doses.**

BREVIS® in combination



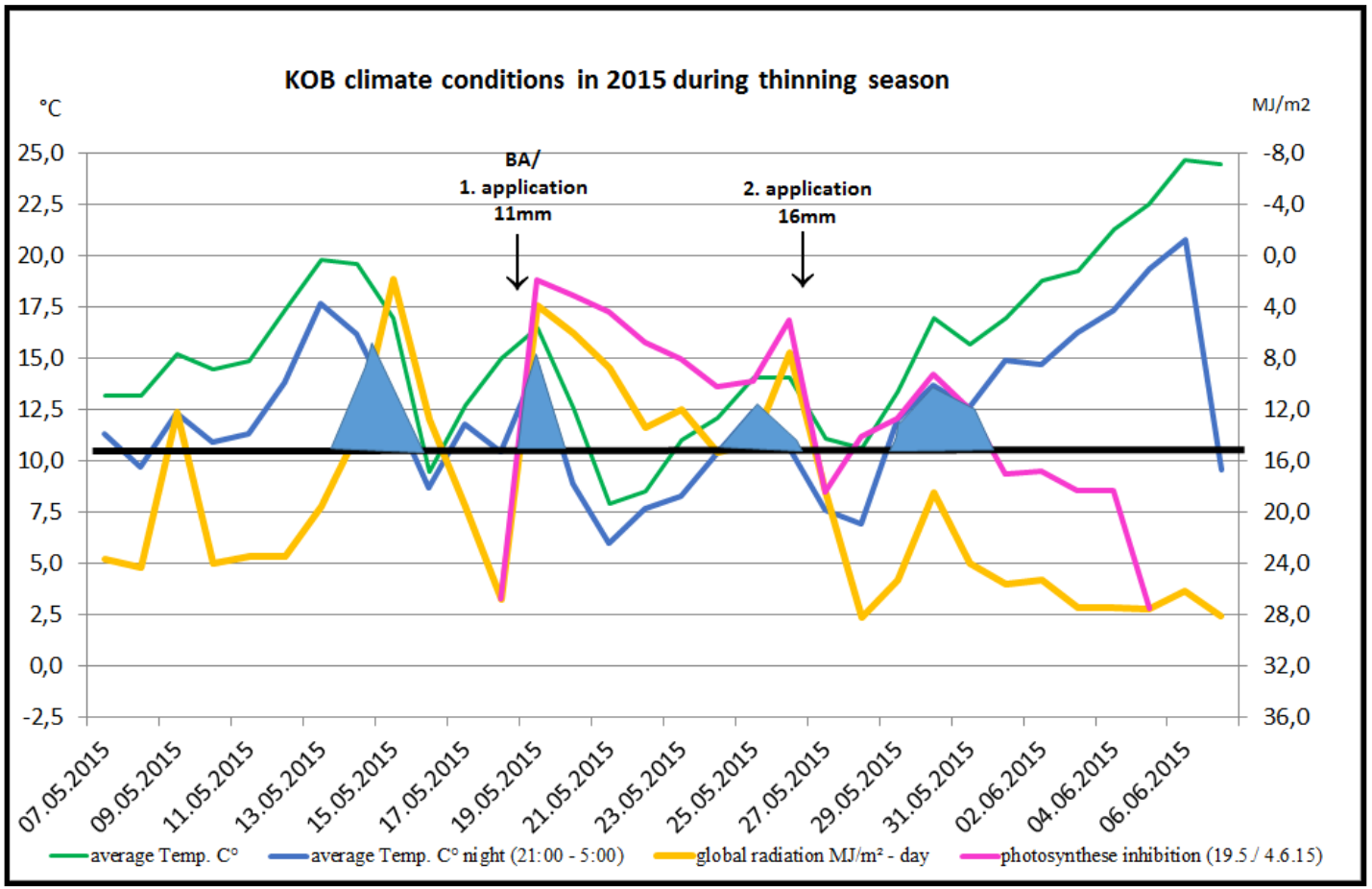
- **Better fruitsize when cropload was lower.**
- **6-BA increased fruitsize combined with Brevis.**

BREVIS® in combination



- Low Brevis amounts added with 6-BA positiv.
- Early ATS with Brevis showed strong reduction.

BREVIS® in combination

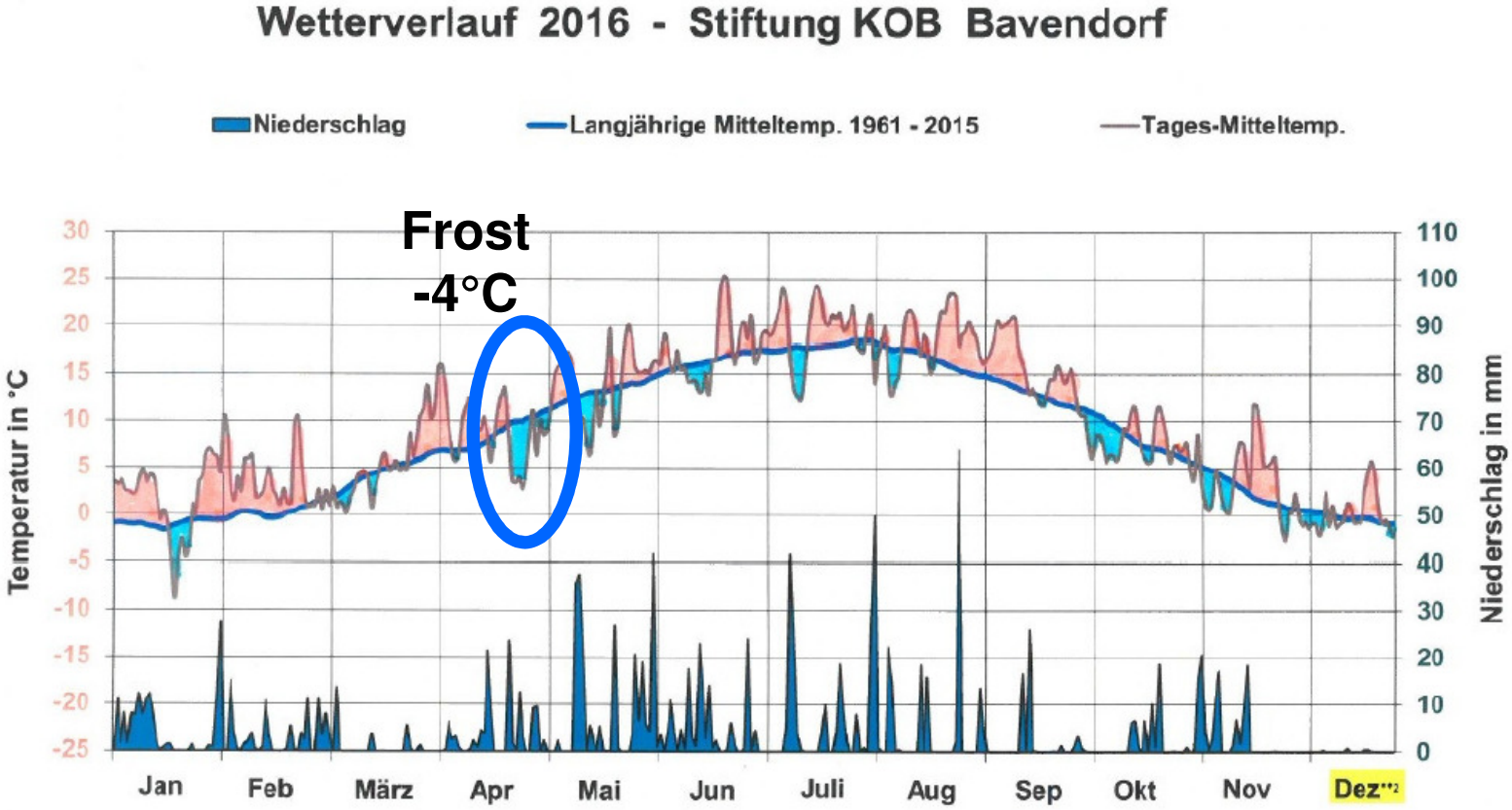


- **Brevis application in between/before risky periods.**
- **High NT and less radiation periods help to explain.**

Conclusion 2015

- ATS and Brevis had done the thinning.
- The combinations of ATS and Brevis were strong.
- Combining ATS and 6-BA with moderate efficacy.
- 6-BA increased fruitsize.
- Both Brevis spraying dates showed efficacy.
- Lower Brevis rates ([2x] 1,1kg/ha) were enough.
- Higher NT seemed to be more important than R

Weather 2016 at KOB station



KOB Homepage: http://www.kob-bavendorf.de/aktuelles/wetterverlauf-1

														2016 ***3 Jahresmittel	Langjähriges Jahresmittel
Temp. °C	1,6 -1.0*	3,7 0.2*	4,5 4.1*	9,1 8.1*	13,1 12.7*	17,1 16.0*	19,6 17.9*	18,7 17.2*	16,5 13.5*	8,3 8.8*	4,4 3.4*	0,2 -0.1*		9,7 °C	8,4 °C
NS in mm	137 257%*	78 151%*	40 66%*	106 148%*	199 205%*	191 169%*	133 120%*	217 199%*	63 80%*	56 82%*	111 159%*	2 3%*		1333 mm	952 mm
Sonne h	64 120%*	66 77%*	145 102%*	170 98%*	206 97%*	186 84%*	259 106%*	261 116%*	231 134%*	110 98%*	58 96%*	84 183%*		1839 h	1747 h

*Vergleichswerte zu den langjährigen Monatsmittelwerten am KOB Bavendorf

vieljähriger Rekordwert

**2 Monat Dezember 2016: zu warm, kein Niederschlag, sehr viel Sonne

***3 Gesamtjahr 2016: zu warm, sehr viel Niederschlag, viel Sonne

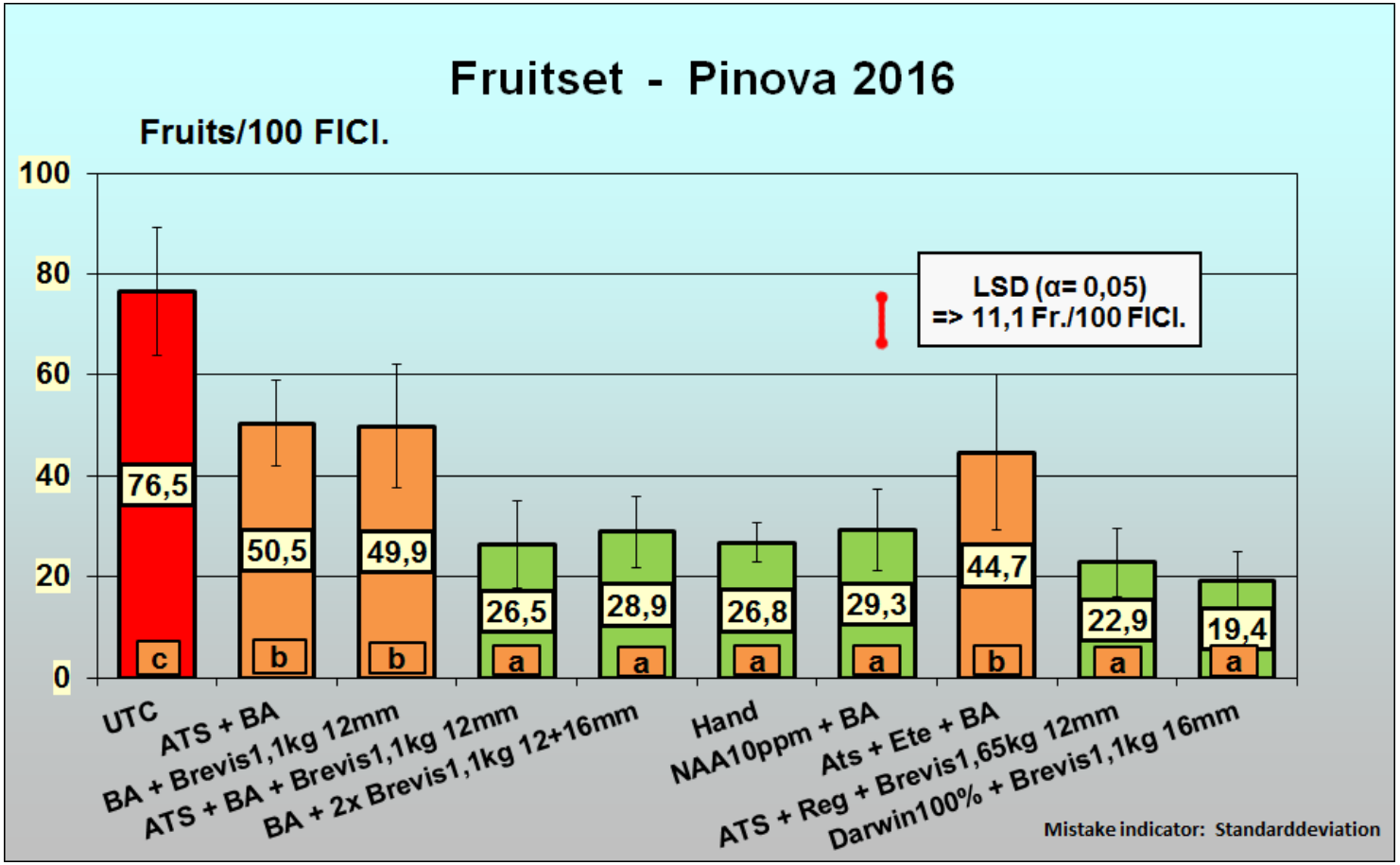
BREVIS® in combination - 2016

VAR	Treatment	Amount g / ml per Hectar	Water	Application
1	UTC	Untreated control		
2	a. ATS	a. AGRO N FL. 28L/ha	a. 1000 l/ha	1.Date:4.5.16 BBCH 65-67 14:45, 15,4°C, 31% R.LF
	b. BA (ProAgro) 10mmØ	b. MaxCel 7,5 l/ha 11 Ø mm beginning warm period	b. 1000 l/ha	2. Date: 20.5.16 10mmØ 12:05, 17,2°C, 46% R.LF
3	a. BA (ProAgro) 10mmØ	a. MaxCel 7,5 l/ha 11 Ø mm beginning warm period	a. 1000 l/ha	1. Date: 20.5.16 10mmØ 12:05, 17,2°C, 46% R.LF
	b. Metamitron 1,1kg/ha 13mmØ	b. BREVIS 1,1 kg/ha=165ppm 13mmØ	b. 1000 l/ha	2. Date: 25.5.16 12mmØ 11:40, 18,5°C, 50% R.LF
4	a. ATS	a. AGRO N FL. 28L/ha	a. 1000 l/ha	1.Date:4.5.16 BBCH 65-67 14:45, 15,4°C, 31% R.LF
	b. BA (ProAgro) 10mmØ	b. MaxCel 7,5 l/ha 11 Ø mm beginning warm period	b. 1000 l/ha	2. Date: 20.5.16 10mmØ 12:05, 17,2°C, 46% R.LF
	c. Metamitron 1,1kg/ha 13mmØ	c. BREVIS 1,1 kg/ha=165ppm 13mmØ	c. 1000 l/ha	3. Date: 25.5.16 12mmØ 11:40, 18,5°C, 50% R.LF
5	a. BA (Plantan) 11mmØ	a. Globaryll 1,5 l/ha 11 Ø mm beginning warm period	a. 1000 l/ha	1. Date: 25.5.16 12mmØ 11:40, 18,5°C, 50% R.LF
	b. Metamitron 1,1kg/ha 11mmØ	BREVIS 1,1 kg/ha=165ppm 11mmØ		1. Date: 25.5.16 12mmØ 12:35, 20,0°C, 48% R.LF
	c. Metamitron 1,1kg/ha 16mmØ	b. BREVIS 1,1 kg/ha=165ppm 16mmØ	b. 1000 l/ha	2. Date: 2.6.16 16mmØ 14:35, 19,9°C, 51% R.LF

BREVIS® in combination - 2016

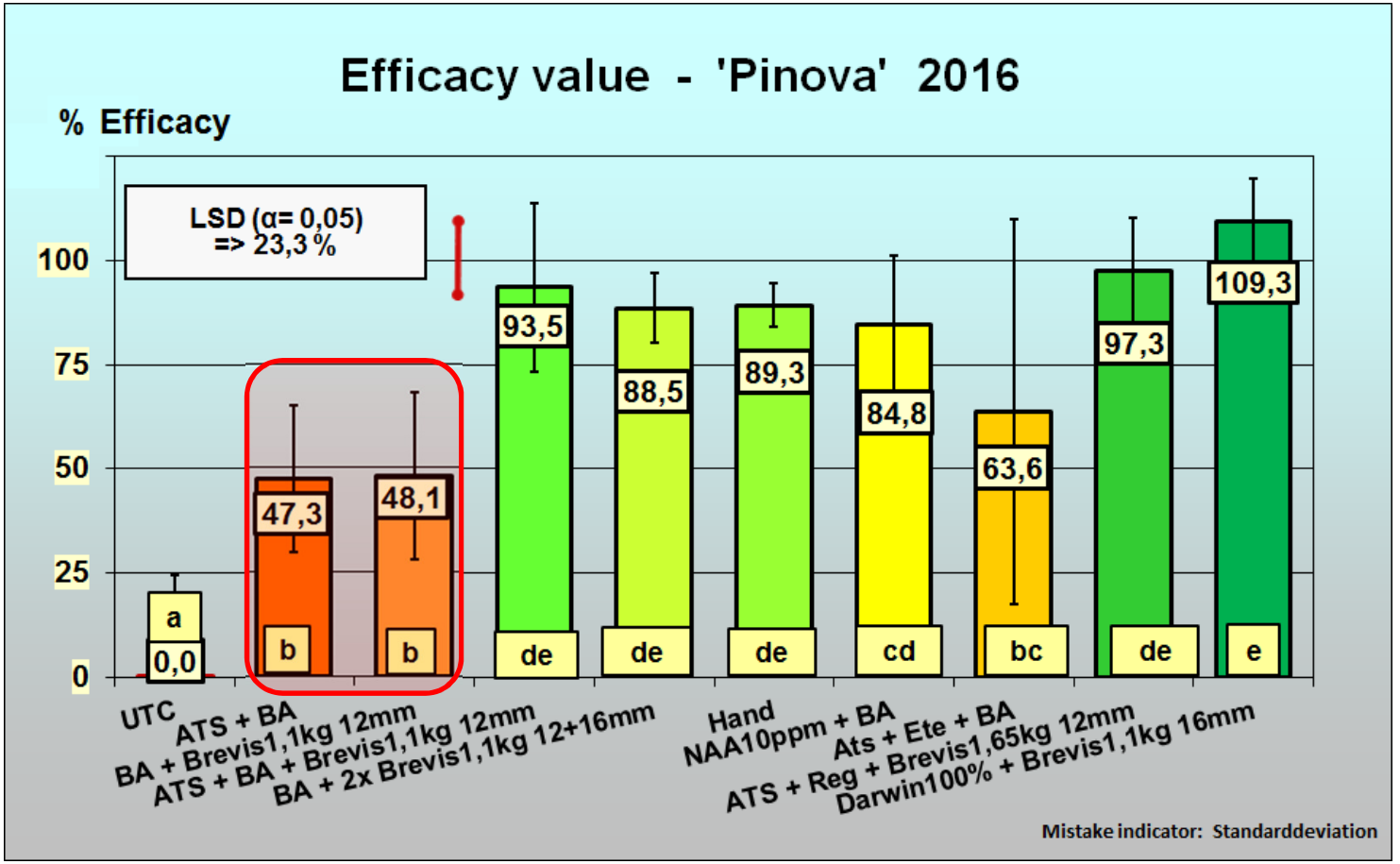
VAR	Treatment	Amount g / ml per Hectar	Water	Application
6	Handthinning	Target 67 Fr/tree ~45 to/ha	-	15 July 2016
7	a. NAA (Plantan) 11mmØ BA (Plantan) 11mmØ	a. PLA 17016 W1 0,1 l/ha 10ppm bei 11 Ø mm Globaryll 1,5 l/ha 11 Ø mm beginning warm period	a. 1000 l/ha	1. Date: 25.5.16 12mmØ 12:00, 18,8°C, 49% R.LF 1. Date: 25.5.16 12mmØ 11:40, 18,5°C, 50% R.LF
8	a. ATS b. Etephon c. BA (ProAgro)	a. AGRO N FL. 28L/ha b. FLORDIMEX 420 300ml/ha c. MaxCel 7,5 l/ha 10 Ø mm beginning warm period	a. 1000 l/ha b. 1000 l/ha c. 1000 l/ha	1.Date:4.5.16 BBCH 65-67 14:45, 15,4°C, 31% R.LF 2. Date: 11.5.16 BBCH 69 14:55, 19,9°C, 64% R.LF 3. Date: 20.5.16 10mmØ 12:05, 17,2°C, 46% R.LF
9	a. ATS b. Brevis 1,65kg/ha 11mmØ c. Regalis Plus	a. AGRO N FL. 28L/ha b. 1,65kg/ha=248ppm c. 1,25kg/ha	a. 1000 l/ha b. 1000 l/ha c. 1000 l/ha	1.Date:4.5.16 BBCH 65-67 14:45, 15,4°C, 31% R.LF 2. Date: 25.5.16 12mmØ 13:35, 20,9°C, 45% R.LF 3. Date: 25.5.16 12mmØ 14:35, 22,1°C, 41% R.LF
10	a. Darwin medium (~ 100% Ekin) b Metamitron 1,1kg/ha 16mmØ	a. 6km/h, 220U/m ½ filaments b. BREVIS 1,1 kg/ha=165ppm 16mmØ	a. b. 1000 l/ha	Date:28.4.16BBCH 63-65 2.Date: 2.6.16 16mmØ 14:35, 19,9°C, 51% R.LF

BREVIS® in combination



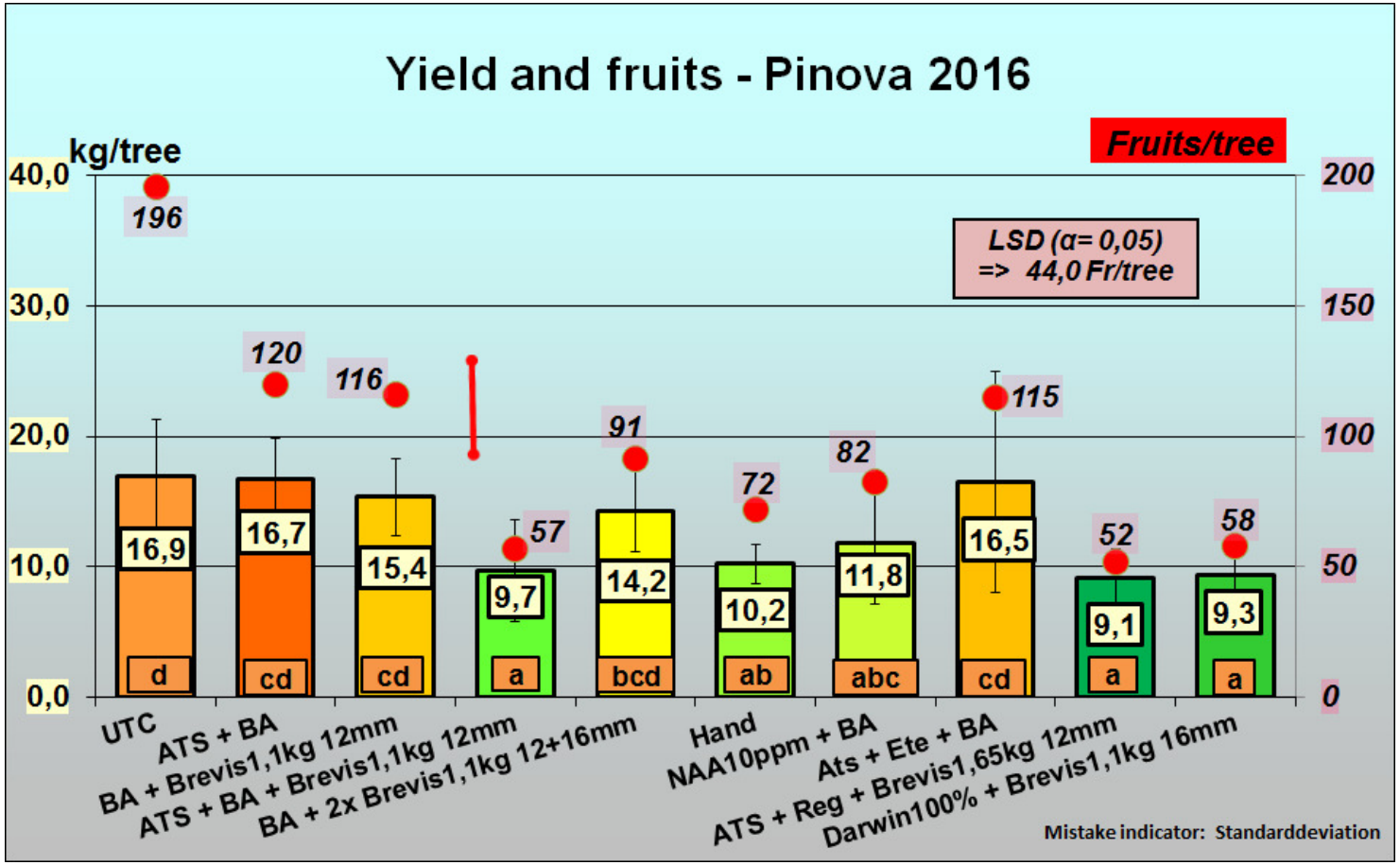
- **Fruitset was lower with all combinations.**
- **ATS / Brevis / Darwin good – 6-BA / Ete soft.**

BREVIS® in combination



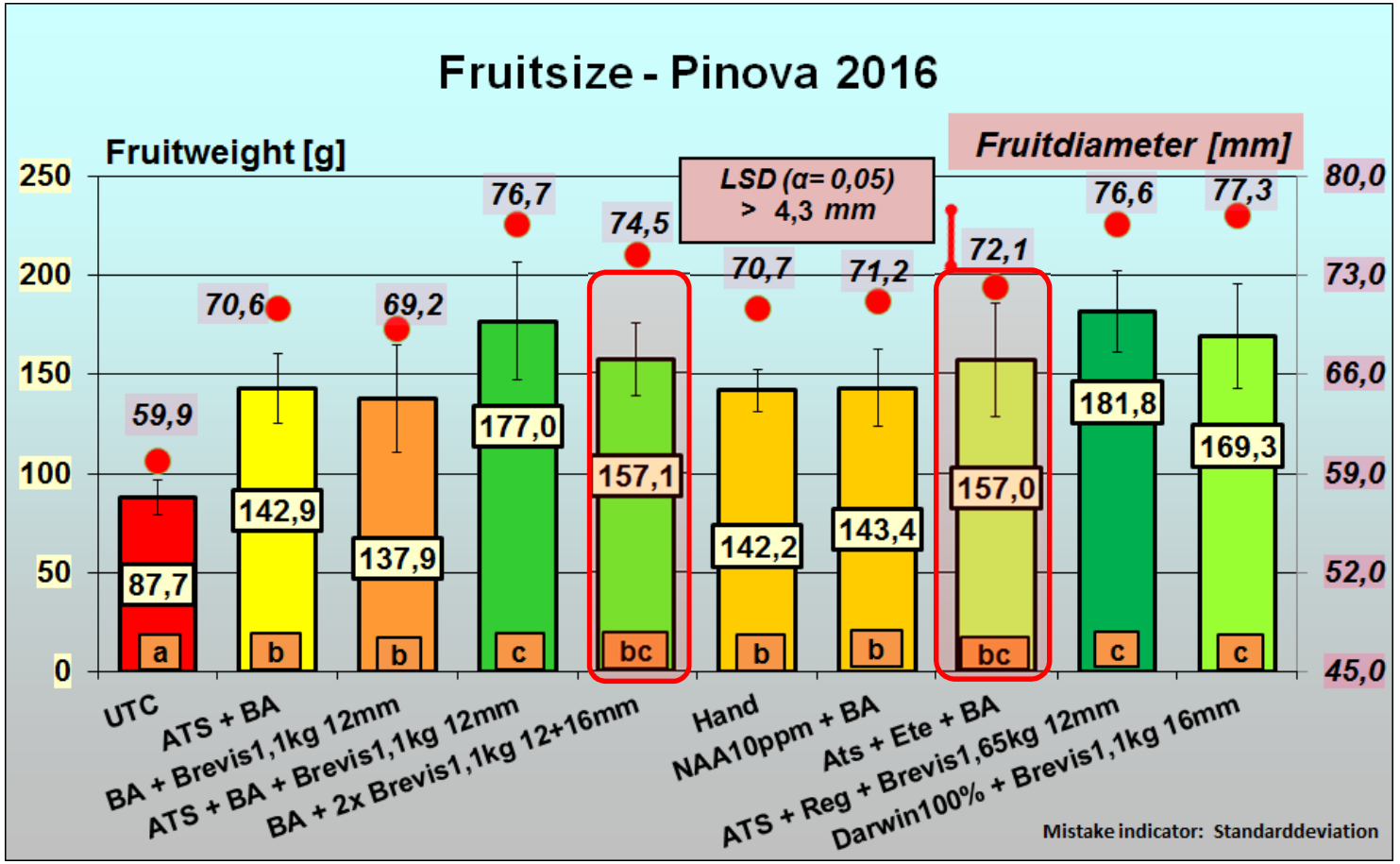
- **High efficacy in all the Brevis combinations.**
- **Brevis+6-BA is similar to ATS+6-BA**

BREVIS® in combination



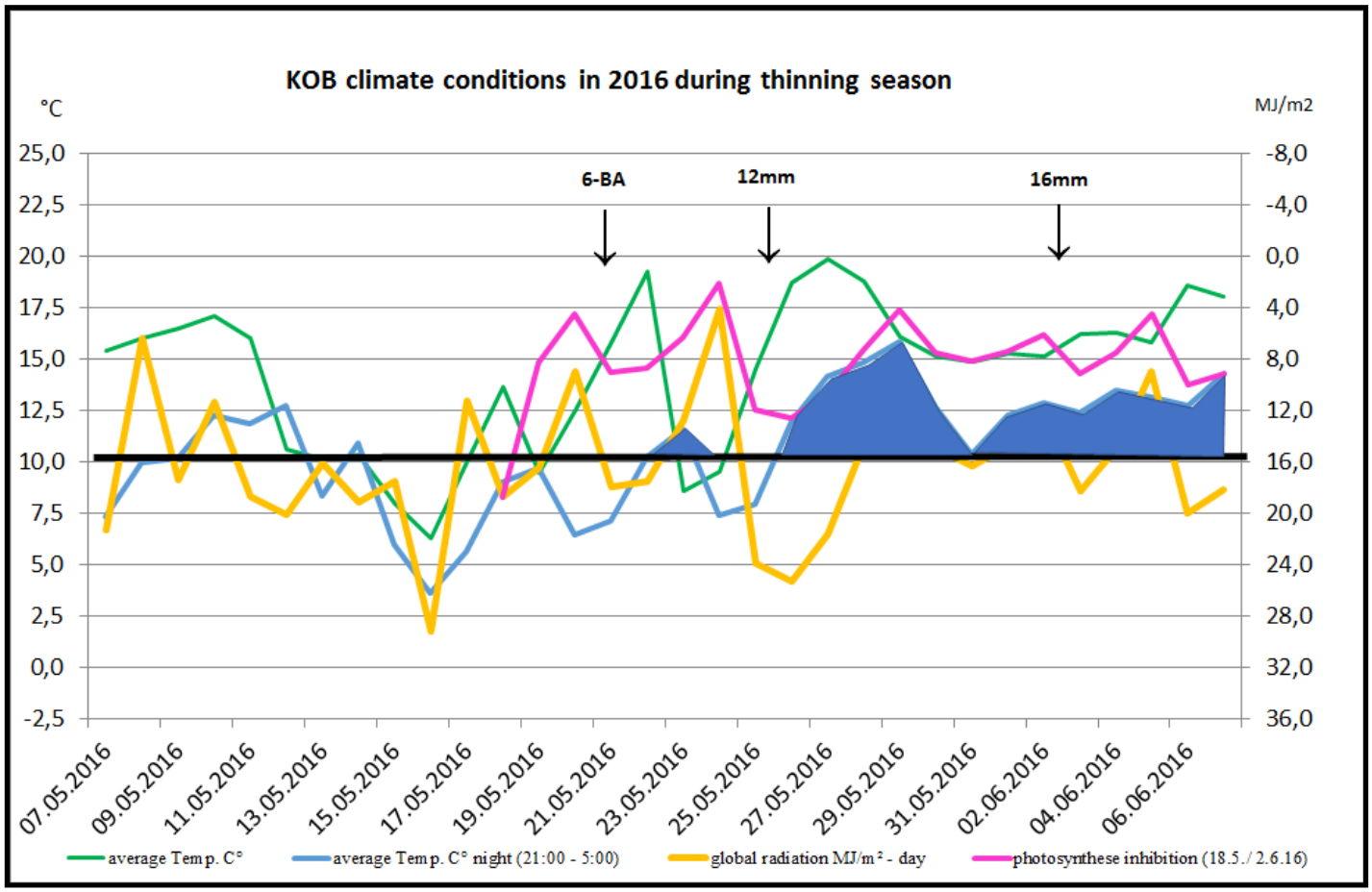
- **12-13kgs/tree would be ideal (≈ 75-80 fruits/tree).**
- **Brevis + early thinning (ATS/Darwin) with less yield.**

BREVIS® in combination



- **6-BA+2x Brevis 1,1kg as well as ATS+Etephon+6-BA were optimal.**

BREVIS® in combination



- **Brevis sprayings before and during period with high night temperatures and low radiation.**

Conclusion 2016

- Lower Brevis rates (1,1kg/ha) with good thinning.
- ATS and Darwin showed good efficacy.
- Brevis / ATS / Darwin almost same level
- Combinations with strong thinning.
- Both Brevis spraying dates showed efficacy.
- Lower Brevis rates ([2x] 1,1kg/ha) were enough.
- Working with Clever model (NT >10°) was good.

Final Conclusions

- Brevis, ATS, Darwin can be used on same level.
- 6-BA is a soft compound: ‚fine tuning‘.
- Combinations can reach good to strong thinning.
- Depending on amount / timing / weather
- Lower Brevis rates were enough.
- Single Brevis application is more safe.
- Clever model (NT > R) valueable to decide timing.

Thanks

for your attention