



Aim

- Evaluation of flower initiation of raspberry 'Glen Ample' and 'Tulameen' under open field conditions
- Impact of time of flower initiation on yield

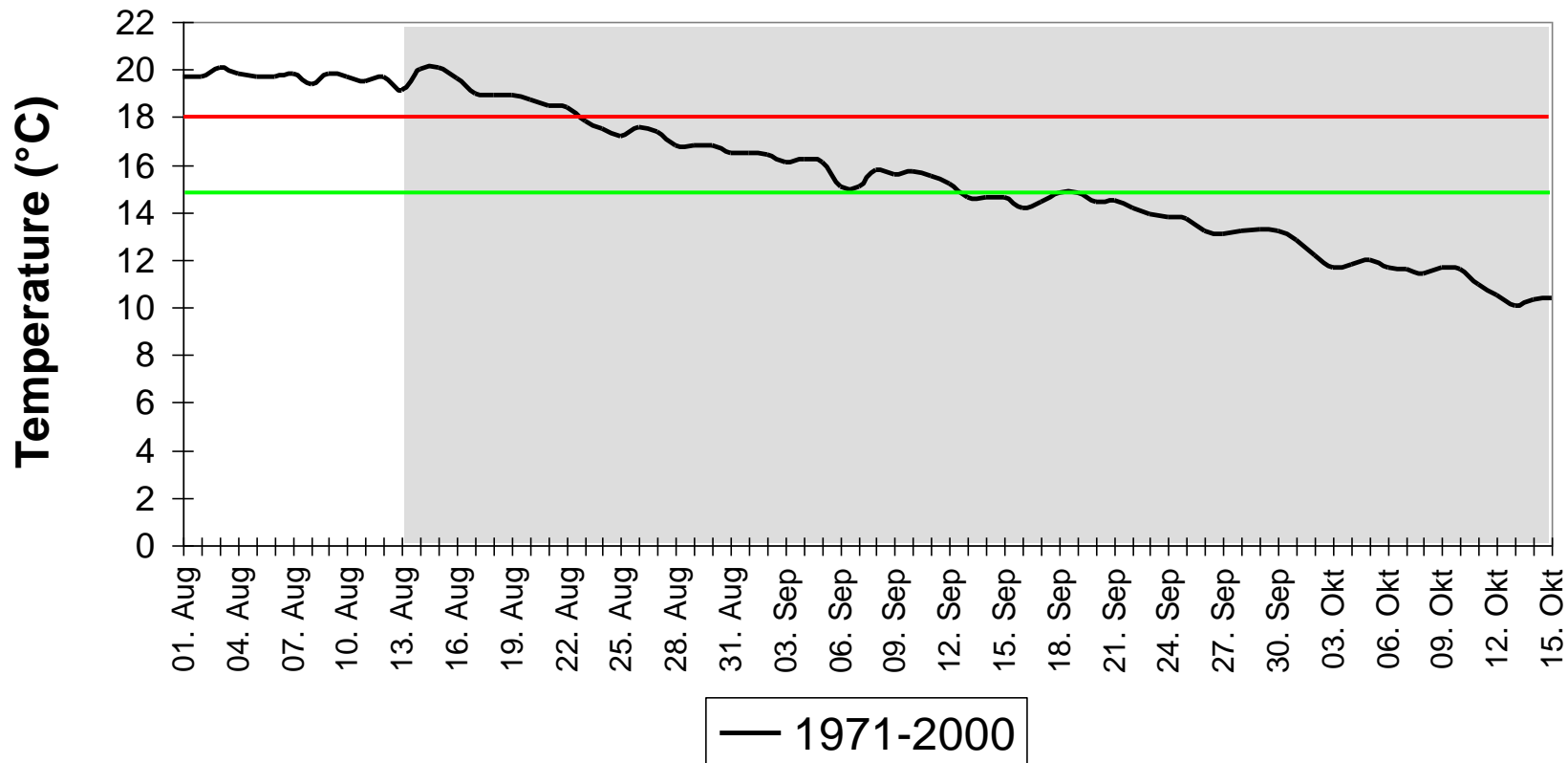


EUBerry

FP7-KBBE-2010-4 EUBerry Grand agreement 265942

Geisenheim

Mean temperature in August until mid-October for 1971-2000

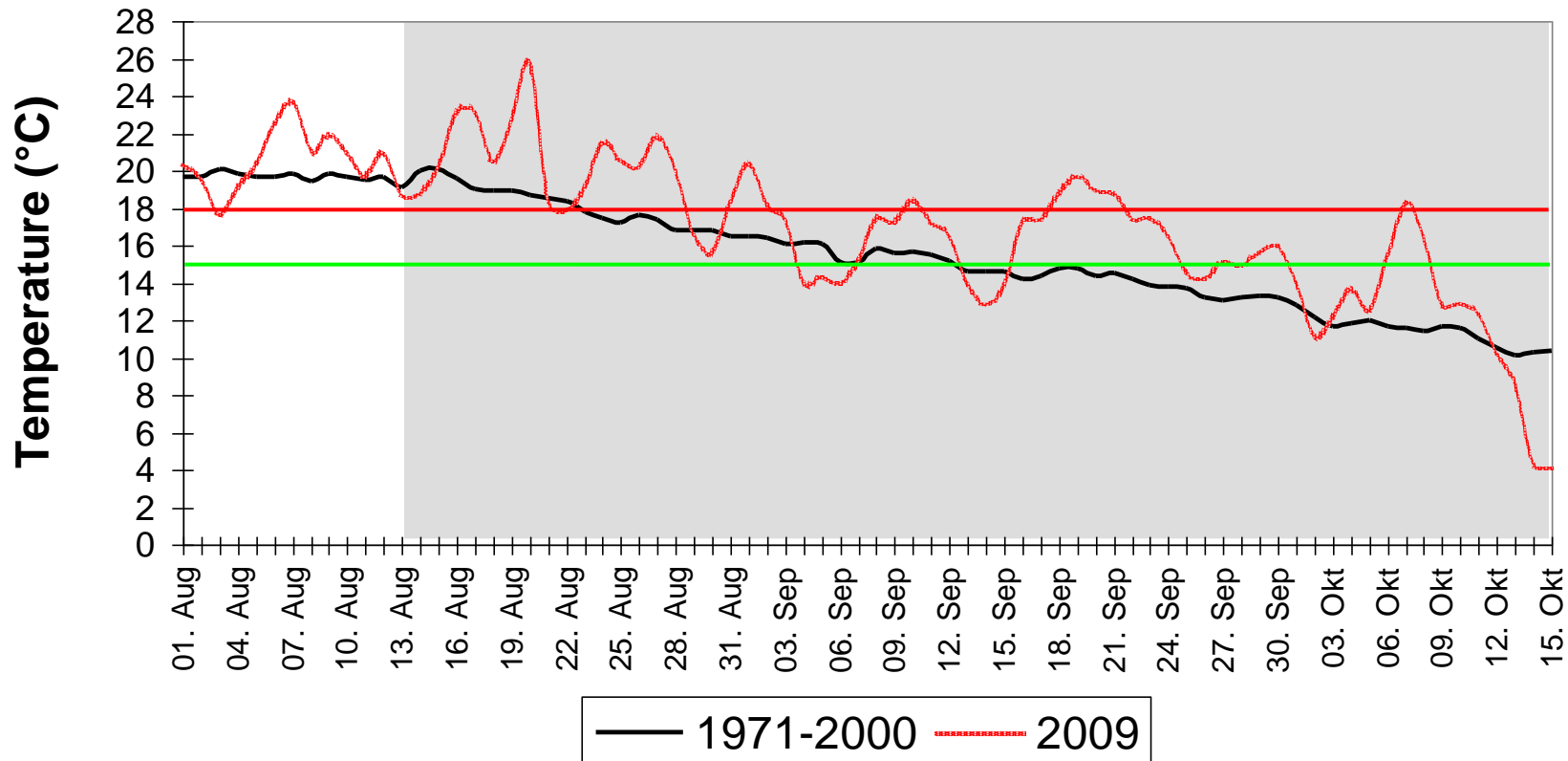


Climate chamber: Glen Ample, day length < 15 h, for 21 days

— flower initiation — no flower initiation

Geisenheim

Mean temperature in August until mid-October for 1971-2000 and 2009

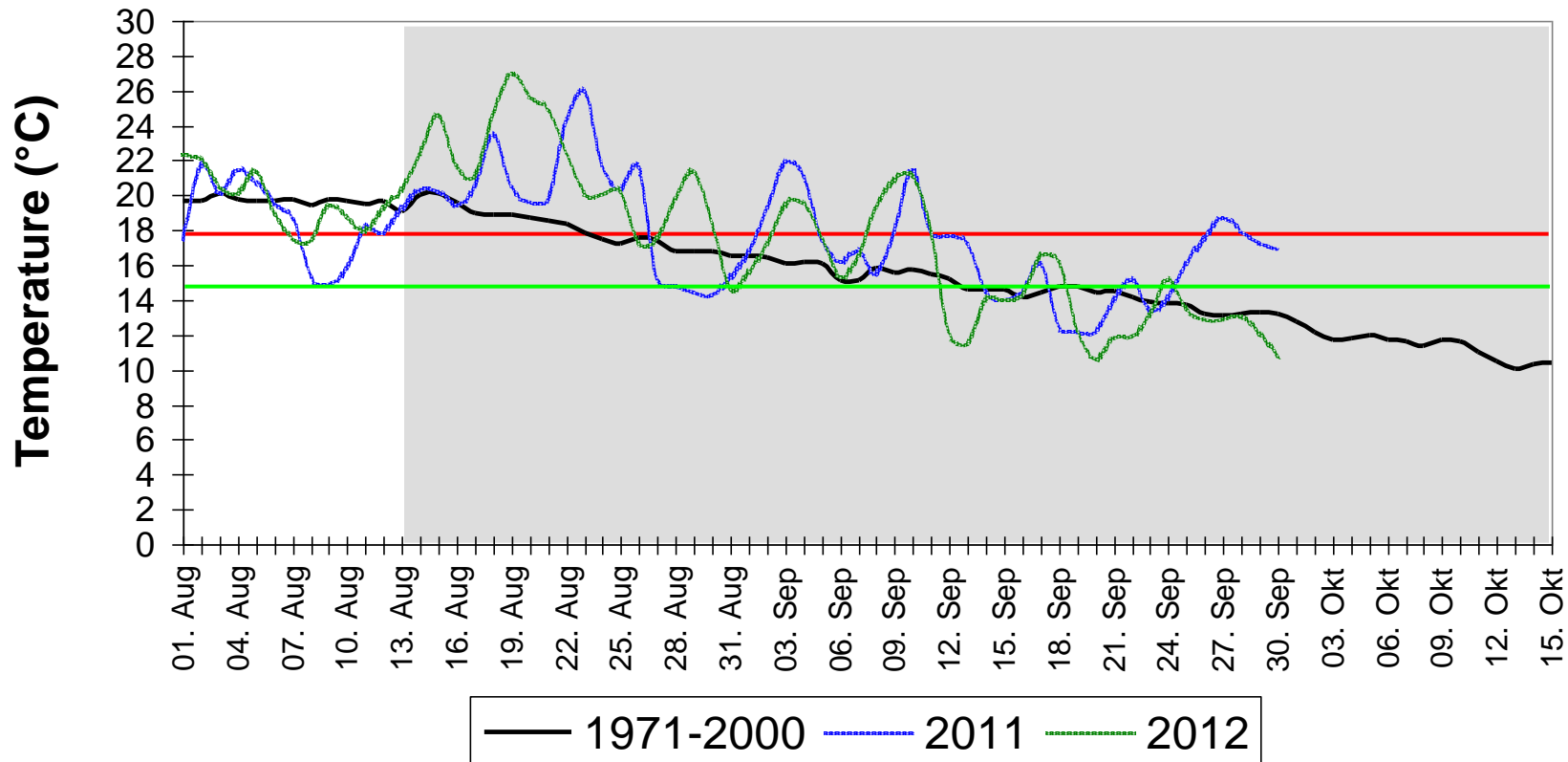


Glen Ample, day length < 15 h, for 21 days

— flower initiation — no flower initiation

Geisenheim




Mean temperature in August until mid-October for 1971-2000 and 2009



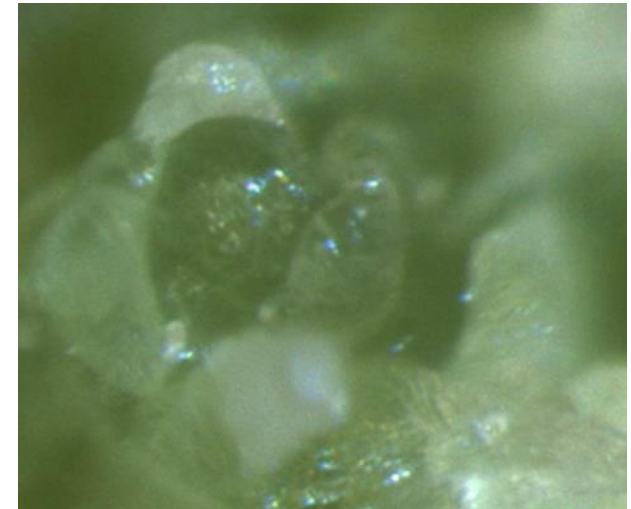
Glen Ample, day length < 15 h, for 21 days

— flower initiation — no flower initiation

Flower initiation of raspberry

Stage	
1	
2	
3	

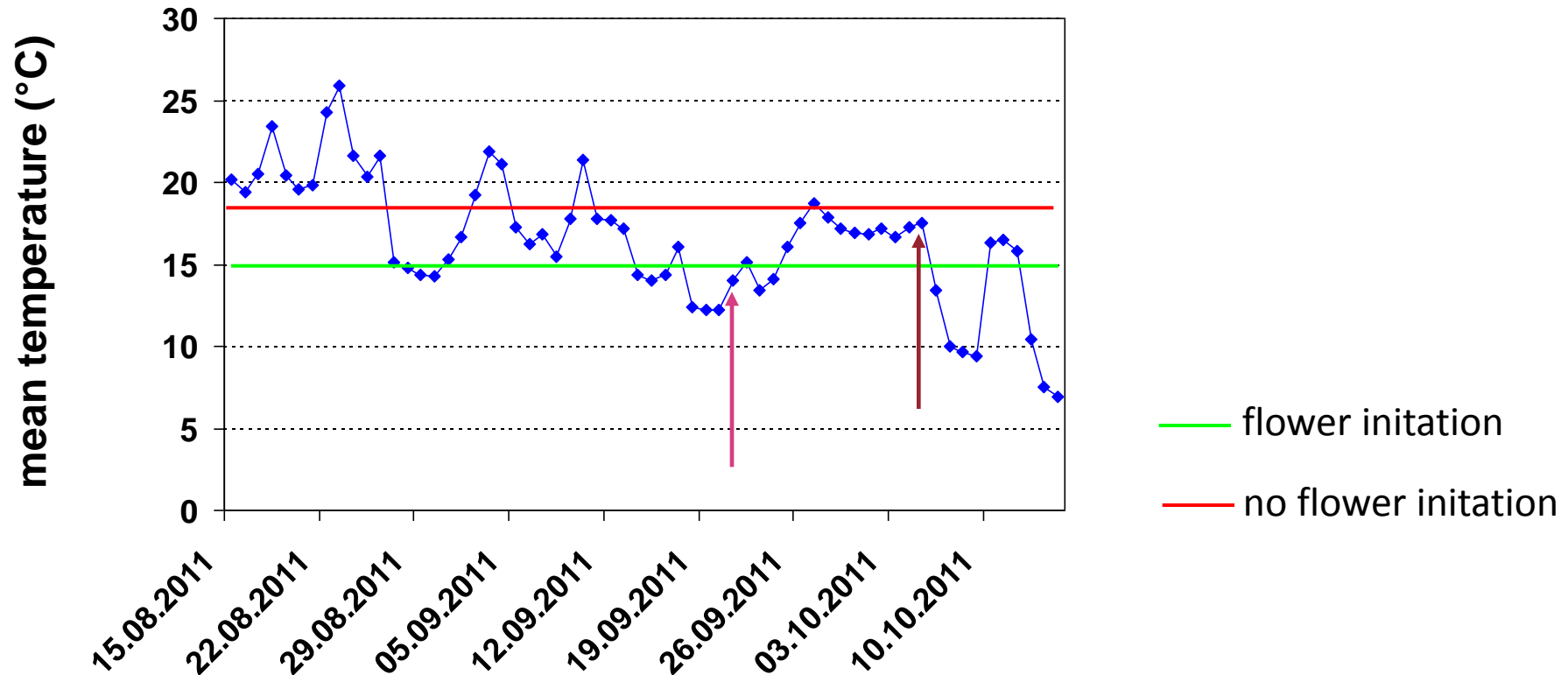
Williams 1959



stage 2

5th bud from the top was examined

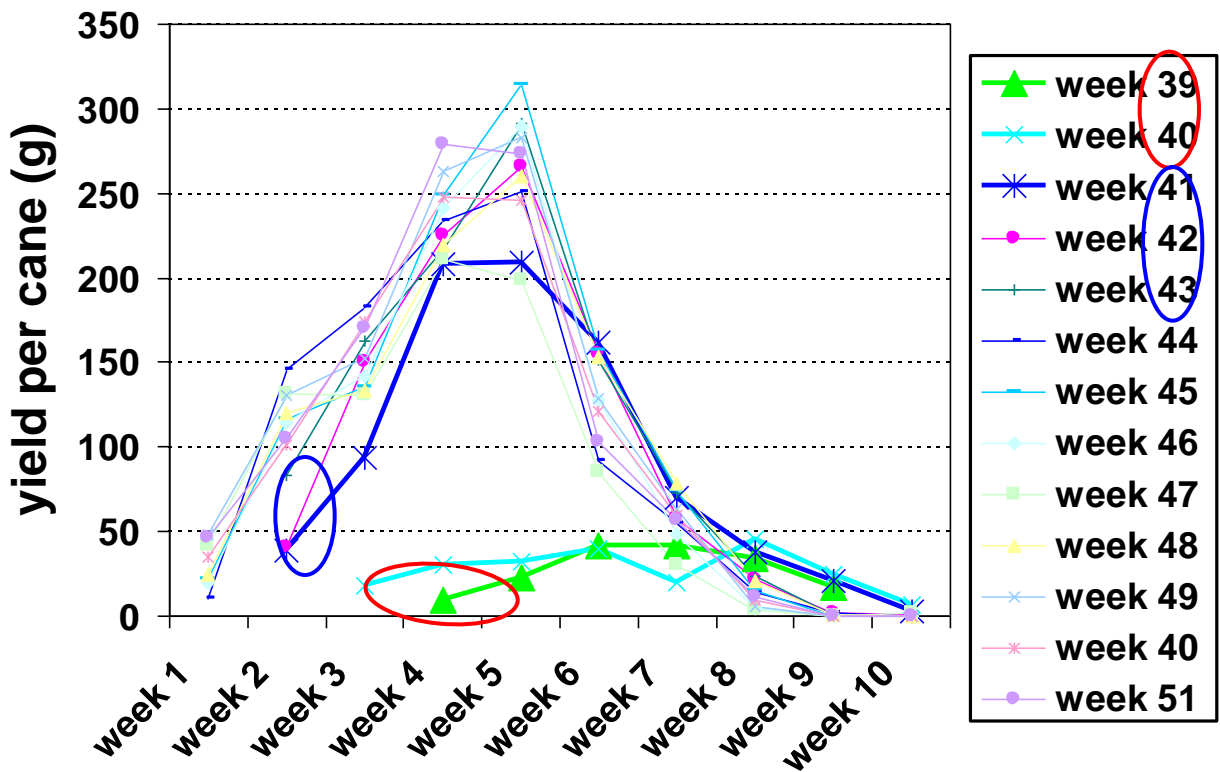
Temperature and flower initiation of 'Tulameen' in 2011, Geisenheim



	date	Ø meristem stage	No. of days with temperature ≤ 15 °C		Ø temperature (°C)	
			3 weeks before	4 weeks before	3 weeks before	4 weeks before
→	21 th Sept.	1.8	8	12	16.4	16.7
→	5 th Oct.	2.0	10	10	15.6	16.1

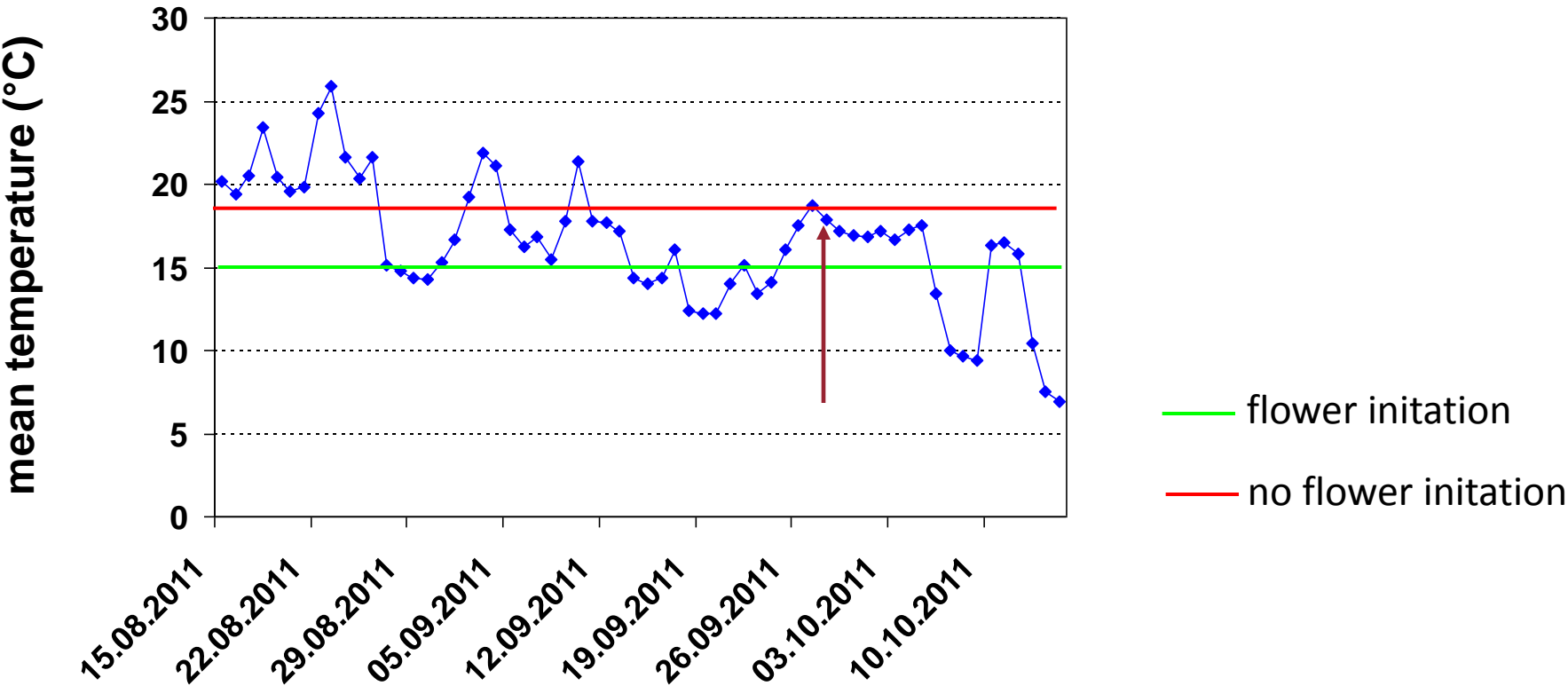
Ripening period and yield of 'Tulameen' in spring 2012

– plants were brought into a storage compartment in a weekly interval, starting at 13th September 2011



Yield per cane (g)	
week 39	167
week 40	211 → definitely stage 2
week 41	840
week 42	919
week 43	1003
week 44	986
week 45	1082
week 46	988
week 47	833
week 48	1011
week 49	1075
week 50	994
week 51	1045

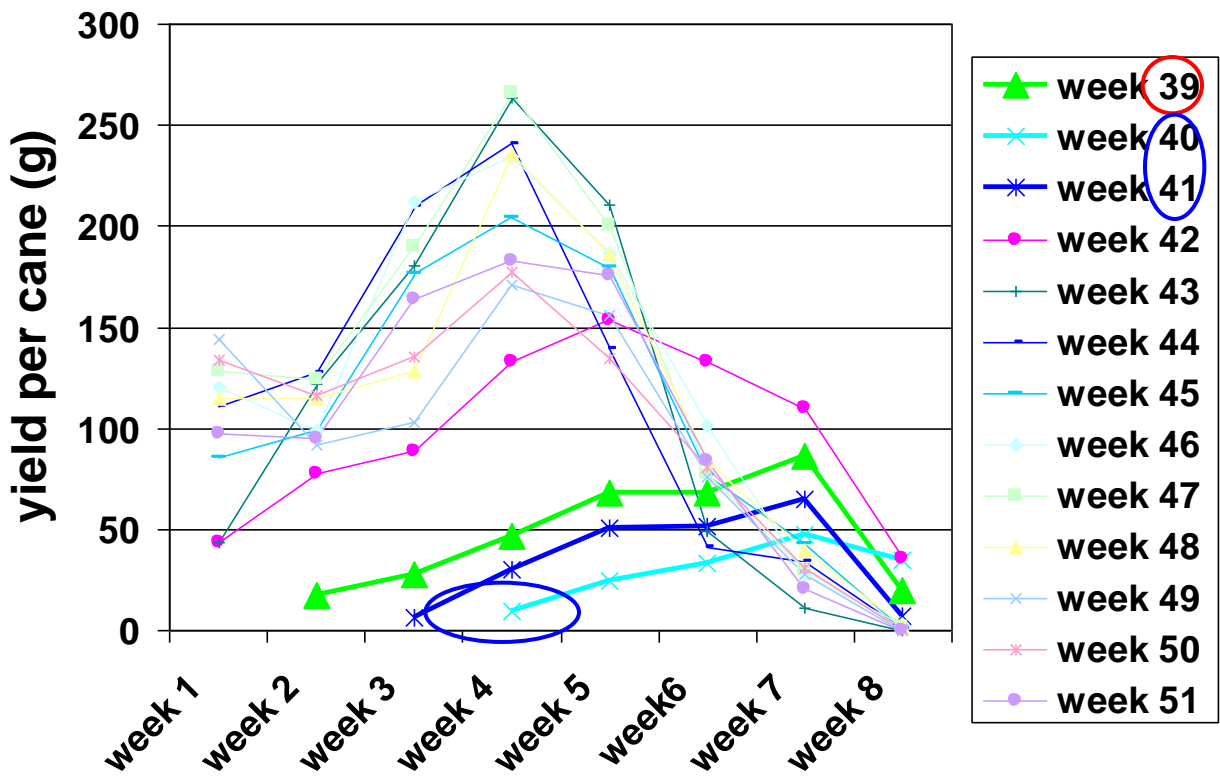
Temperature and flower initiation of 'Glen Ample' in 2011, Geisenheim



	date	Ø meristem stage	No. of days with temperature ≤ 15 °C		ø temperature (°C)	
			3 weeks before	4 weeks before	3 weeks before	4 weeks before
→	28 th Sept.	2.4	10	10	15.8	16.4

Ripening period and yield of 'Glen Ample' in spring 2012

- plants were brought into a storage compartment in a weekly interval, starting at 13th September 2011



Yield per cane (g)

334	→ definitely stage 2
150	
212	
775	
879	
904	
864	
985	
1018	
905	
769	
810	
819	

Ripening period and yield of 'Glen Ample' in spring 2012

- plants were brought into a storage compartment in a weekly interval, starting at 13th September 2011

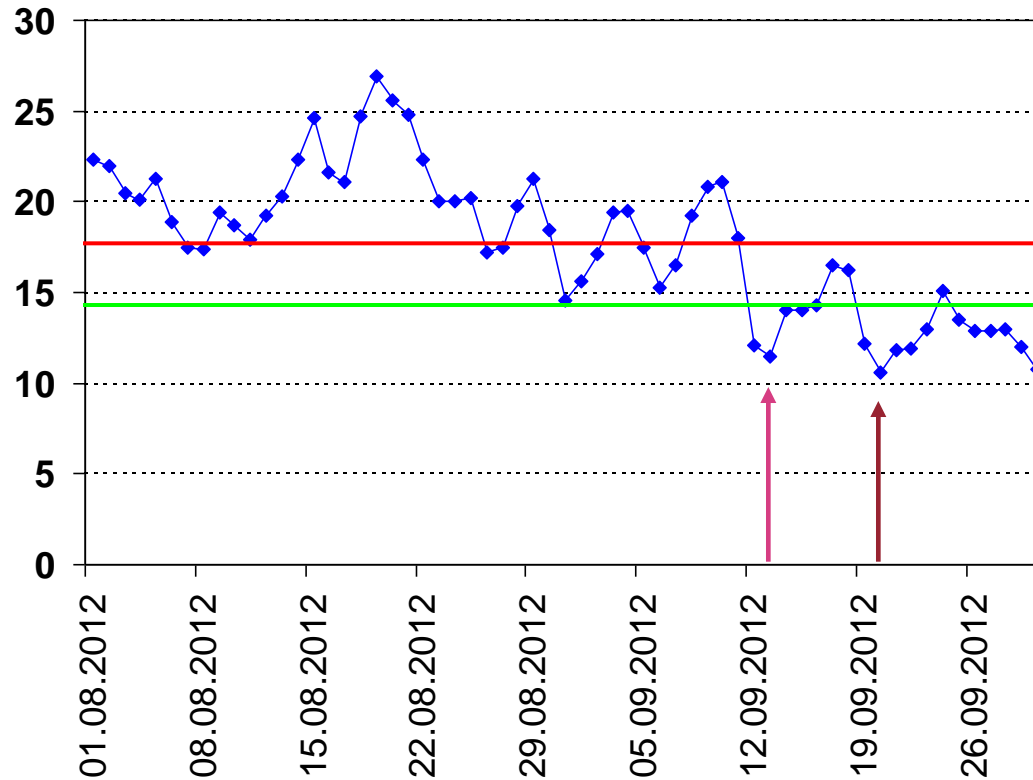


Glen Ample

- brought to the storage compartment in week 39
- only few fruits, a lot of laterals are vegetative in the next spring

Temperature and flower initiation of 'Tulameen' in 2012, Geisenheim

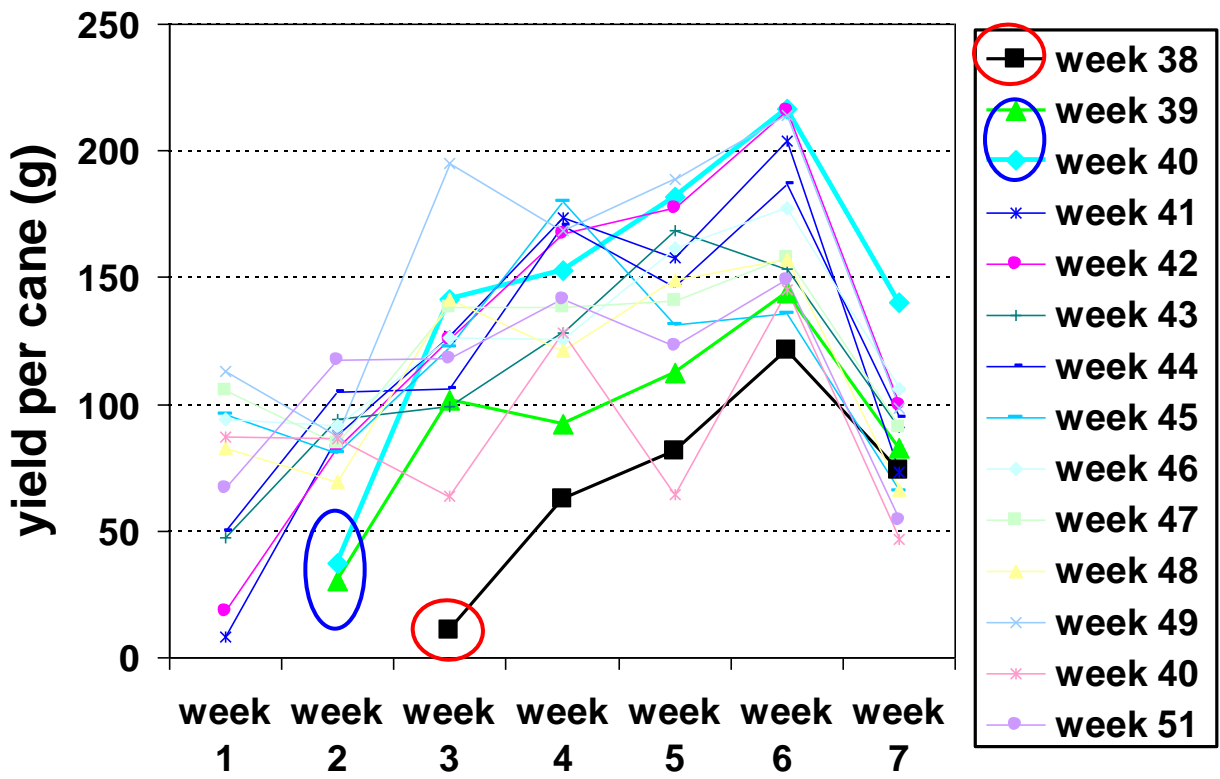
mean temperature (°C)



— flower initiation
— no flower initiation

	date	Ø meristem stage	No. of days with temperature ≤ 15 °C		Ø temperature (°C)	
			3 weeks before	4 weeks before	3 weeks before	4 weeks before
→	13 th Sept.	1.8	2	2	18.0	19.5
→	20 th Sept.	2.0	2	2	16.4	16.9

Ripening period and yield of 'Tulameen' in spring 2013
 – plants were brought into a storage compartment in a weekly interval, starting at 17th September 2012

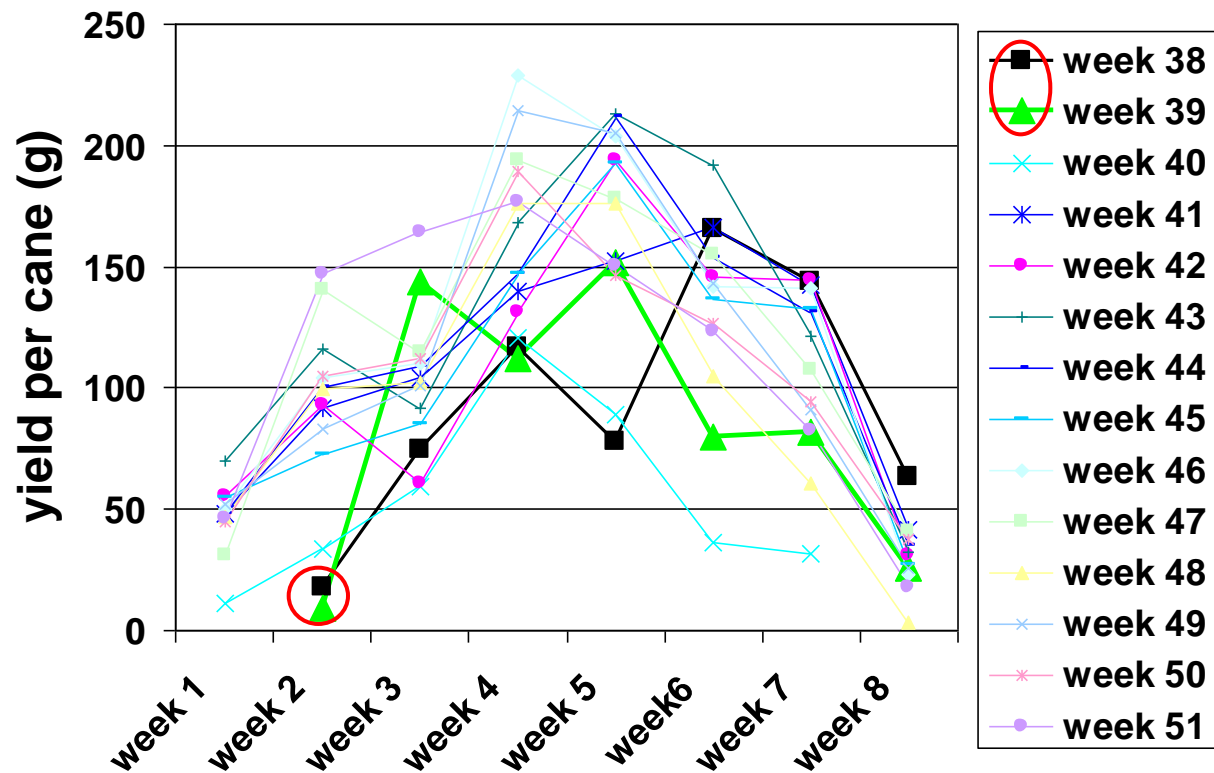


Yield per cane (g)

350	→ definitely stage 2
563	
870	
831	
888	
782	
859	
812	
882	
856	
786	
1075	
621	
770	

Ripening period and yield of 'Glen Ample' in spring 2013

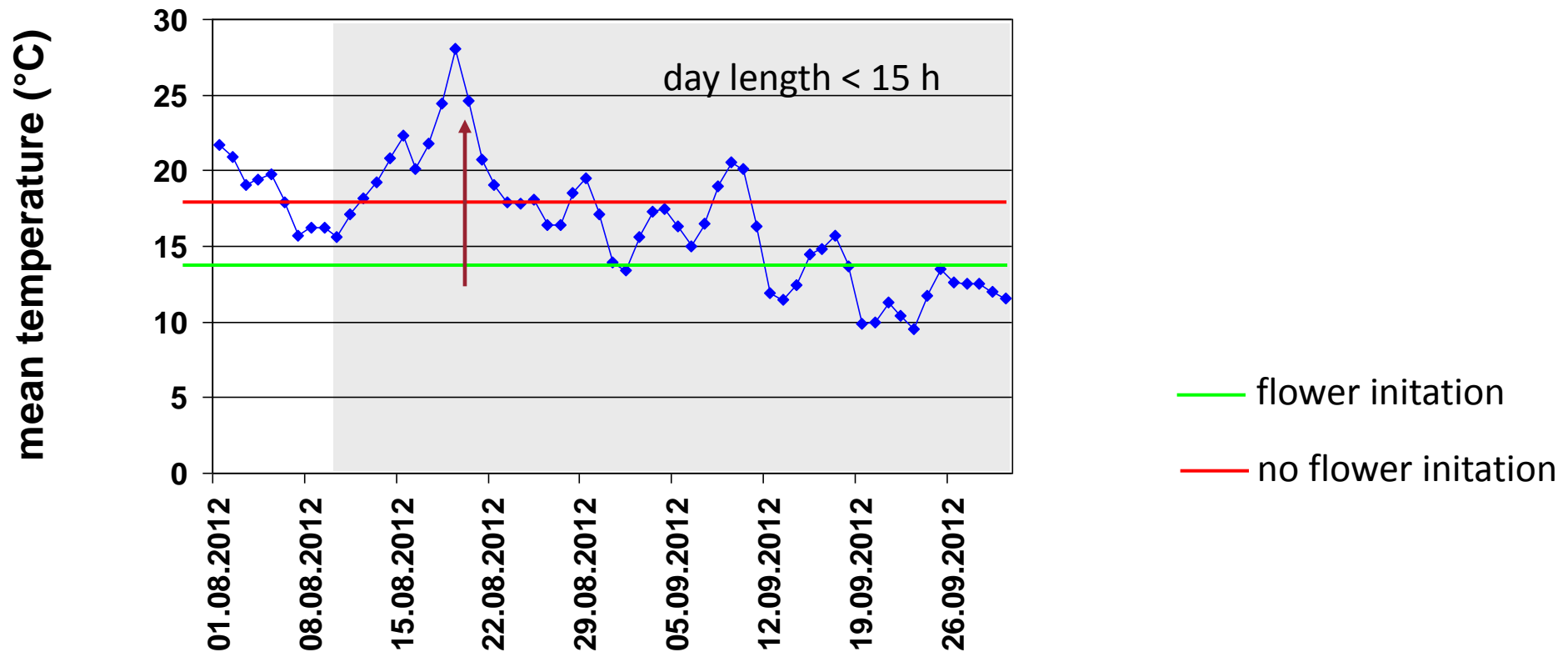
– plants were brought into a storage compartment in a weekly interval, starting at 17th September 2012



Yield per cane (g)

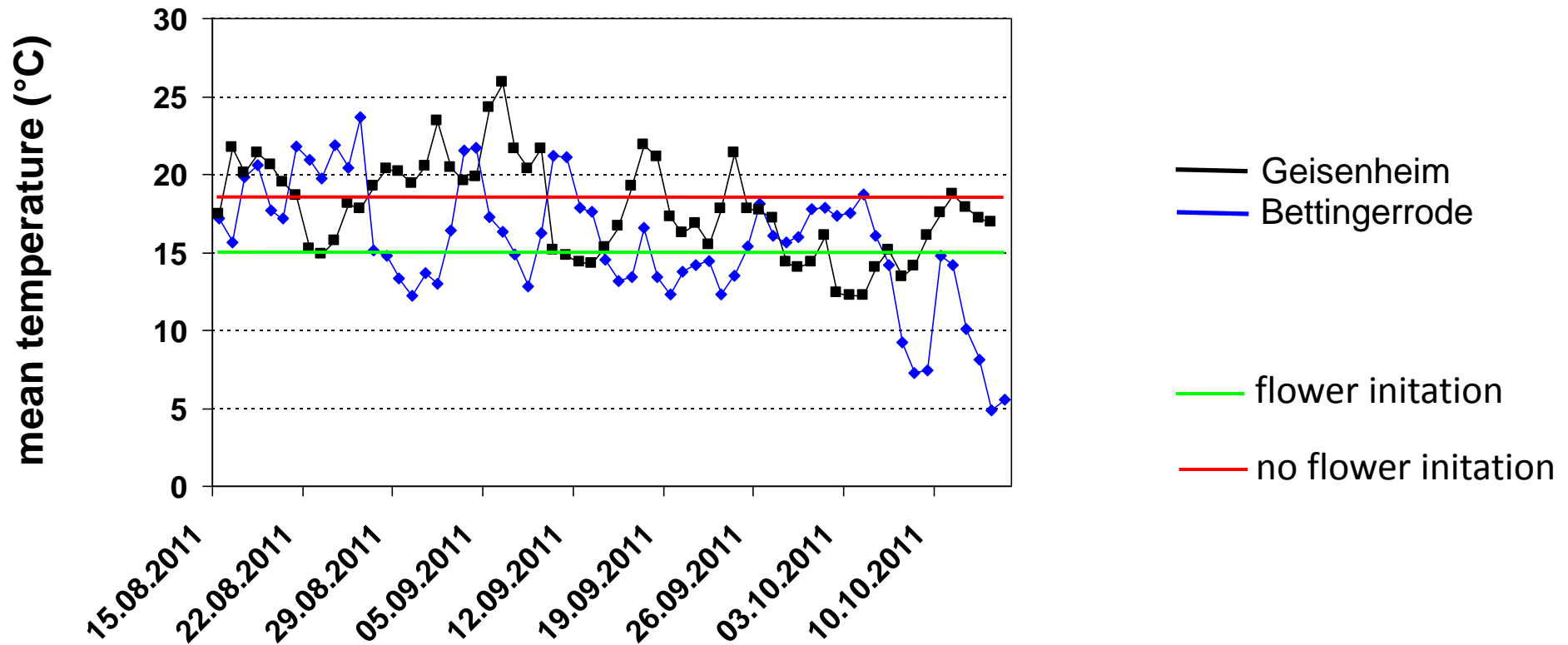
week 38	659	→ definitely stage 2
week 39	604	
week 40	382	
week 41	888	
week 42	855	
week 43	1004	
week 44	937	
week 45	848	
week 46	1006	
week 47	963	
week 48	770	
week 49	916	
week 50	856	
week 51	908	

Temperature and flower initiation of 'Glen Ample' in 2012, Langförden



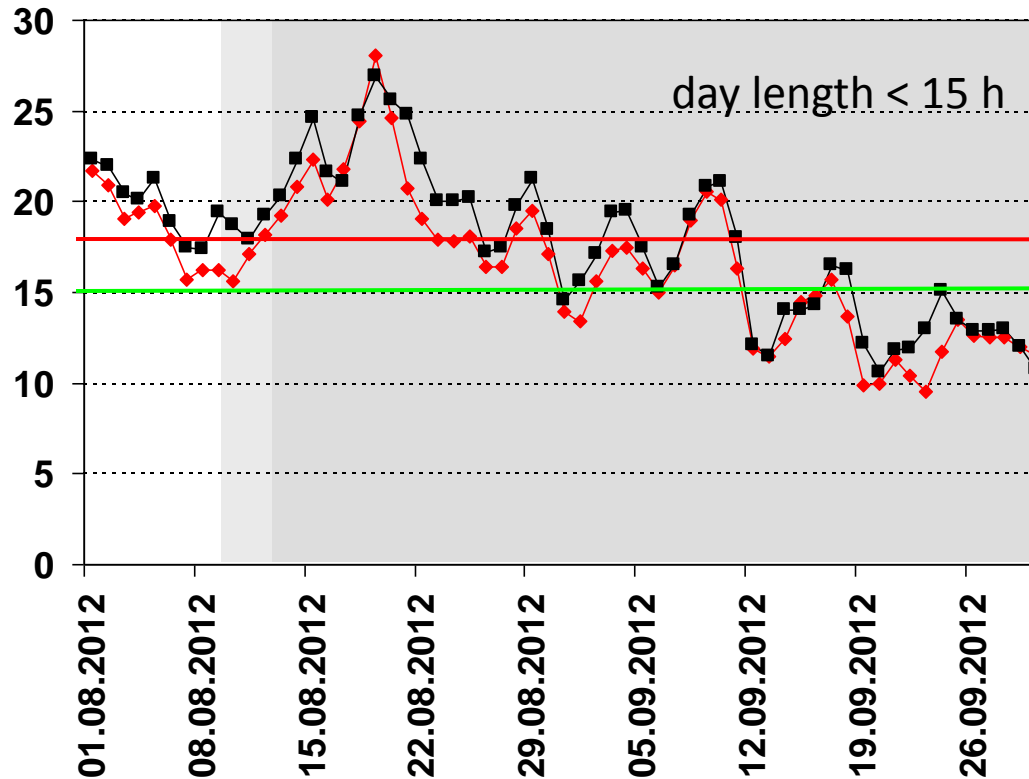
	date	Ø meristem stage	No. of days with temperature ≤ 15 °C		Ø temperature (°C)	
			3 weeks before	4 weeks before	3 weeks before	4 weeks before
→	20 th Aug.	2.0	-		~20.0	

Temperature in Bettingerrode 2011 in comparison to Geisenheim



Temperature in Langförden in comparison to Geisenheim in 2012

mean temperature (°C)



- Geisenheim
- Langförden
- flower initiation
- no flower initiation

Flower initiation of Tulameen in 2011 and 2012

	date	Ø meristem stage	No. of days with		Ø temperature (°C)	
			3 weeks before	4 weeks before	3 weeks before	4 weeks before
Geisenheim 2011	21 th Sept.	1.8	8	12	16.4	16.7
	5 th Oct.	2.0	10	10	15.6	16.1
Geisenheim 2012	13 th Sept.	1.8	2	2	18.0	19.5
	20 th Sept.	2.0	2	2	16.4	16.9
Bettingerrode 2011	28 th Sept.	2.2	12	14	15.4	15.8
Langförden 2012	20 th Aug.	1.8	-	-	~20.0	
	27 th Aug.	2.0	1	-	19.0	19.2

Flower initiation of Glen Ample in 2011 and 2012

	date	Ø meristem stage	No. of days with		Ø temperature (°C)	
			3 weeks before	4 weeks before	3 weeks before	4 weeks before
Geisenheim 2011	28 th Sept.	2.4	10	10	15.8	16.4
Geisenheim 2012	21 th Sept.	2.1	2	2	18.0	19.5
Bettingerrode 2011	21 th Sept.	1.8	11	14	16.0	16.4
Langförden 2012	20 th Aug.	2.0	-		~20.0	

- flower initiation for 'Glen Ample' earlier than for 'Tulameen'
- early transport of raspberries into the storage compartment delayed harvest begin and reduced yield for both varieties
- in 2011, flower initiation took place at both sites after day length reached < 15 h, but was earlier in 2012 for the northern site
- under open-field conditions, at both sites and in both years, no. of days with <15 °C mean temperature were less than the postulated time of 21 days (Sønsteby and Heide 2008)
- in 2012, \varnothing temperature the weeks before the meristem reached stage 2 were clearly higher than 15 °C