A collage of tropical elements including a parrot, palm trees, a mountain, and a large avocado half.

*Improved understanding of
irregular bearing in
‘Shepard’ avocado of
North Queensland,
Australia*

*Bridie Carr - Queensland Department of Agriculture
and Fisheries*

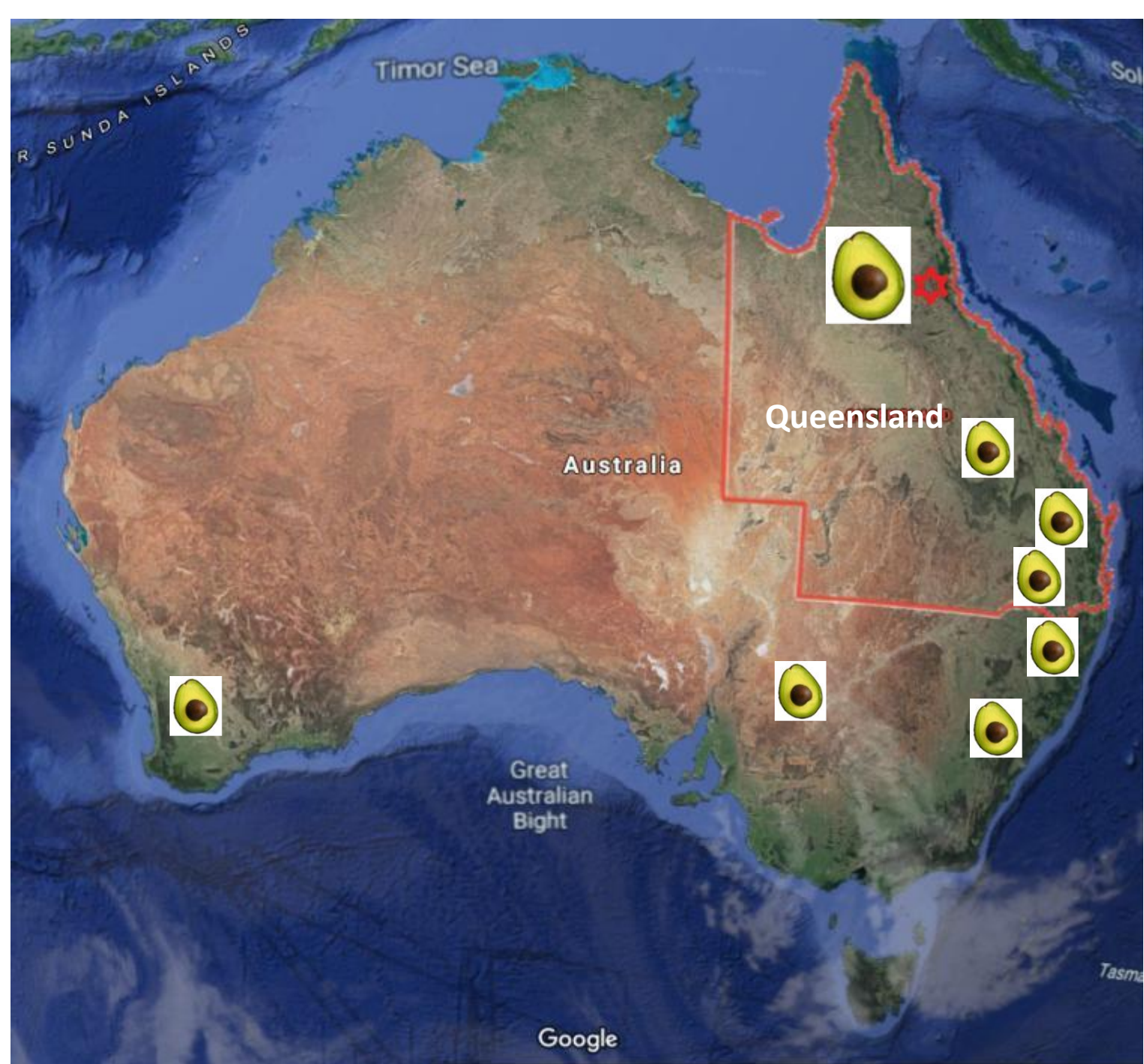




Image: Harris Farm

- ‘Shepard’ accounts for **53%** of the **2,220** hectares of avocados grown in the Atherton Tablelands, in North Queensland
- Irregular bearing (IB) causes financial issues for growers and marketers with inconsistent yields
- Low temperatures during flowering and fruit-set believed to be the cause of IB in ‘Shepard’

Atherton tableland sites included in the study



Mareeba:
510 m ASL

Walkamin:
585 m ASL

Tolga:
750 m ASL



Mean max and min temperatures during 'Shepard' and 'Hass' flowering.

		2015		2016		2017	
Site	Elevation ASL (m)	Max.	Min.	Max.	Min.	Max.	Min.
<i>'Shepard'</i>							
Mareeba	510	27.7	14.4	28.8	15.6	27.7	15.1
Walkamin	585			28.0	15.8	26.3	15.0
Tolga	750	23.8	12.1	25.7	14.2	25.7	12.7
<i>'Hass'</i>							
Mareeba		28.4	14.9	29.6	15.9	28.0	14.5
Walkamin				29.4	16.2	26.6	13.8
Tolga		24.6	13.2	27.6	14.8	26.3	12.0

Potential 'pollination' event

- A period when temperatures are potentially favourable for fruit-set
- Taken as **3** consecutive nights when minimum temperatures were above of **10°C for Hass**, and **13°C for Shepard**

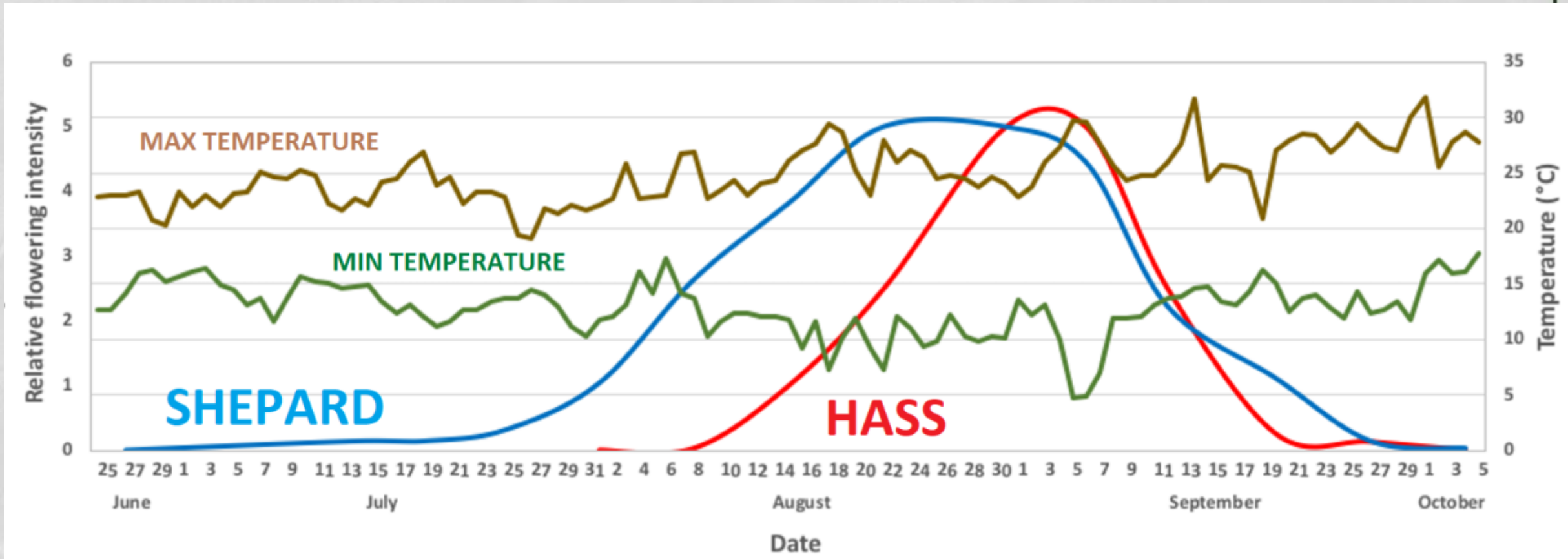


Number of 'pollination' events as a % of total potential number

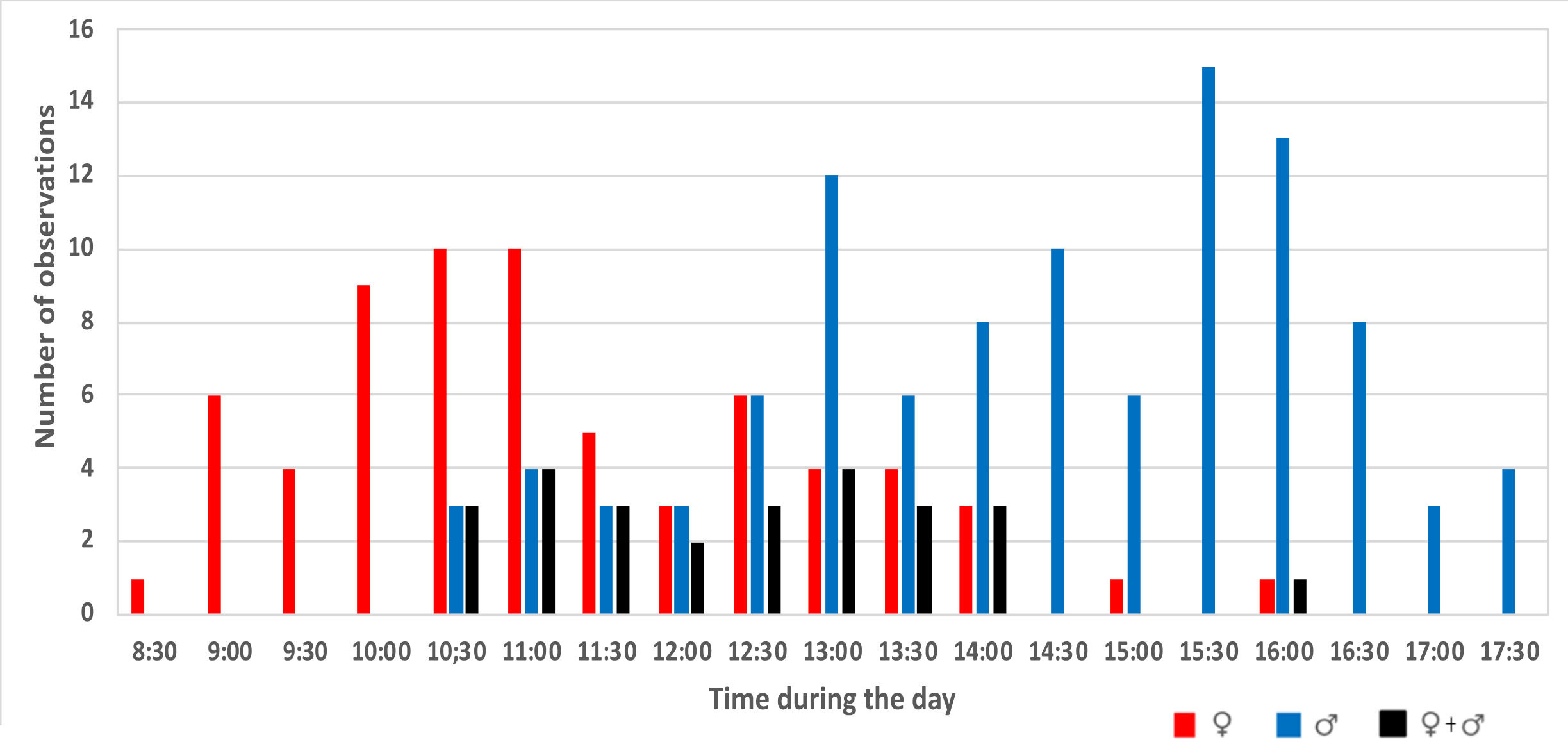
Site	2015		2016		2017	
<u>'Shepard'</u>						
Mareeba	69 %	12.9 weeks	85 %	11.0 weeks	68 %	15.4 weeks
Walkamin			92 %	11.0 weeks	71 %	16.3 weeks
Tolga	29 %	14.9 weeks	44 %	11.0 weeks	30 %	13.0 weeks
<u>'Hass'</u>						
Mareeba	96 %	6.9 weeks	100 %	9.1 weeks	100 %	10.1 weeks
Walkamin			100 %	8.1 weeks	93 %	6.1 weeks
Tolga	89 %	7.0 weeks	85 %	7.1 weeks	62 %	8.1 weeks

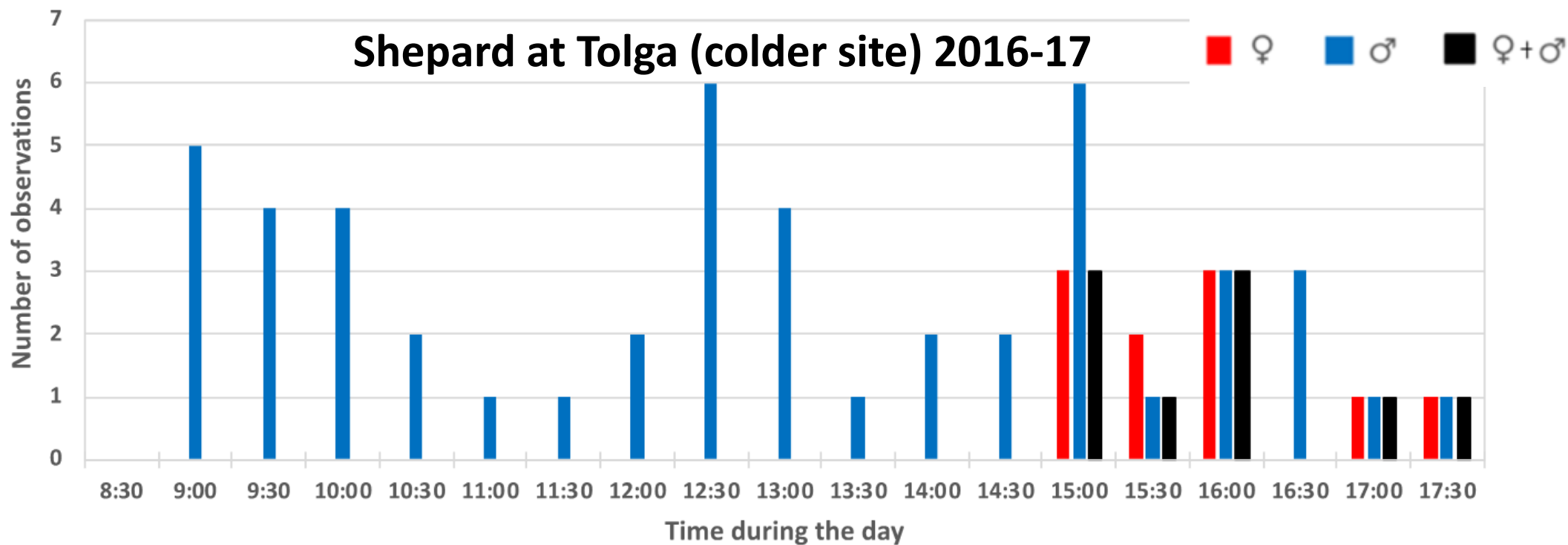
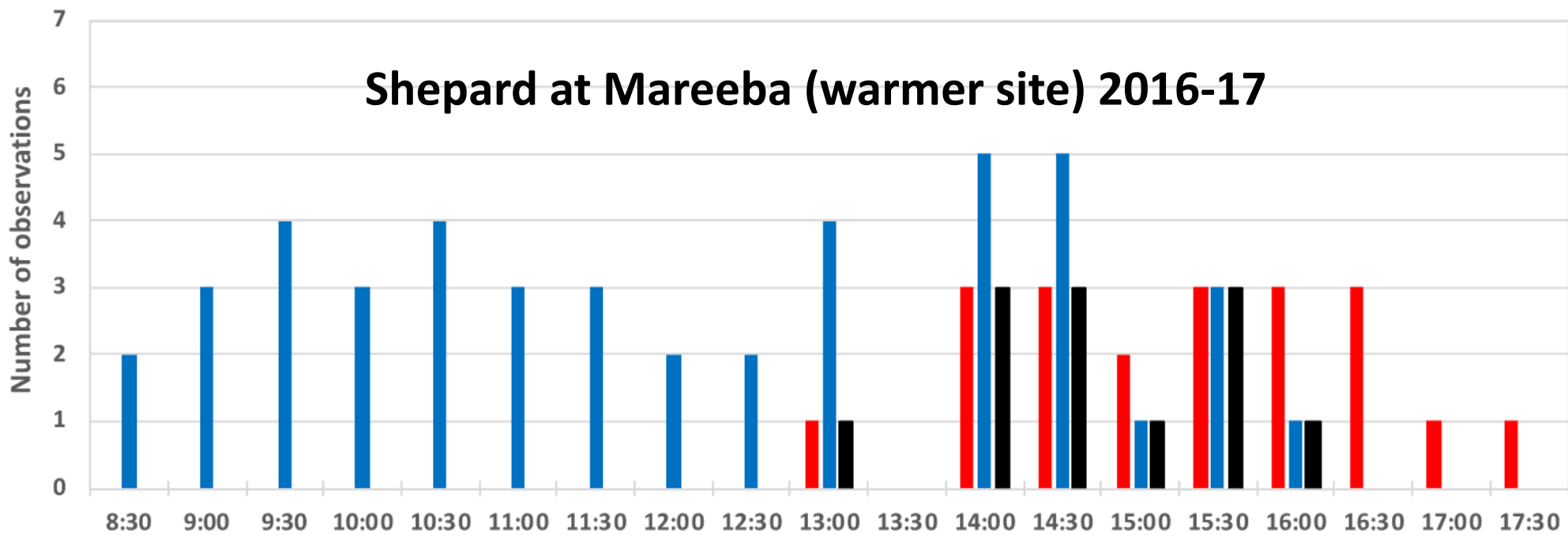
Flowering, and flower behaviour

Relative timings of 'Shepard' and 'Hass' flowering in relation to temperature as exemplified by flowering at Tolga in 2017.



Frequency of occurrence of 'Hass' female (♀) and male (♂) flower stages during the day across three sites in 2016 and 2017.

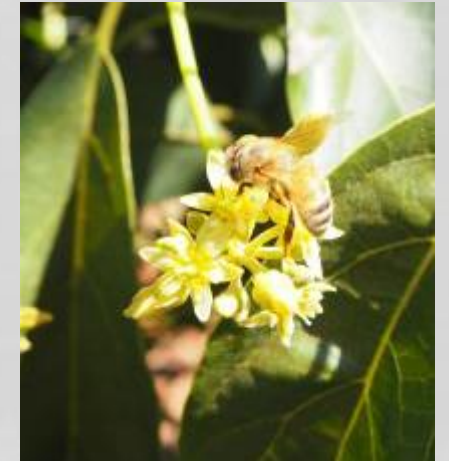
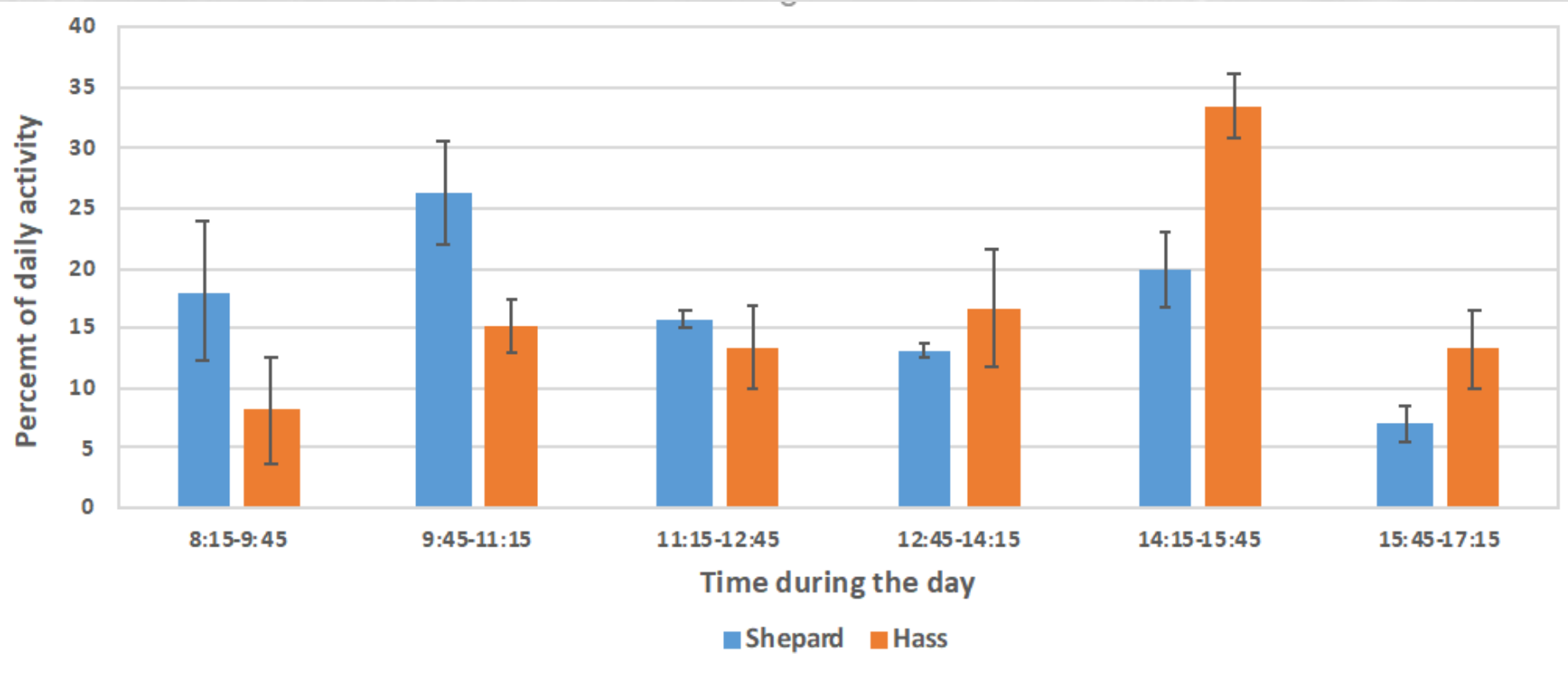




Mean recorded timings of 'Shepard' and 'Hass' female (♀) and male (♂) flower stages in 2016 and 2017.

	Site	Mean	Range
<i>Shepard</i>		♂ and ♀ together	
	Mareeba	14:44	13:10-16:13
	Walkamin	14:56	13:30-17:13
	Tolga	15:49	14:50-17:15
<i>Hass</i>		♂ and ♀ together	
	Mareeba	11:38	10:40-12:33
	Walkamin	12:27	10:15-14:04
	Tolga	13:06	10:50-16:06

Trends in mean activity of insects foraging 'Shepard' and 'Hass' flowers at Mareeba, Walkamin and Tolga in 2016 and 2017.



Key findings

- Hass and Shepard flowering overlapped for about 7 weeks
- Hass female and male opening times were the reverse of Shepard
- Delayed flower opening times at Tolga (colder site) supports research that cooler temperatures delay flowering opening
- Overlap of Shepard female and male flowers (when close pollination might occur) occurred when pollinator activity had declined and gives insight into the irregular bearing process
- Low temperature may be influential in other aspects of fruit set that might lead to irregular bearing, requires further research

Recommendations

- For proposed plantings, assess irregular bearing risk and choose varieties accordingly, and consider interplanting.
- For established plantings, employ practices that promote light and warmth within the orchard to try to advance flower opening times that could lead to overlap of female and male flowers when pollinators are more active
- Encourage pollinator diversity – species that work in cooler conditions/later in the day



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¡Gracias!

