Sugar Research Australia

Recent successes of photoperiod crossing at Sugar Research

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Field Flowering often sparse and unreliable

- Average of 30-35% of SRA parents flower annually
- Average of 1,200 to 1,500 cross-combinations produced annually
- Field flowering has been very poor in recent years, mostly due to high temperatures

Year	Max. Temperature (°C) During Initiation		Min. Temperature (°C) During Initiation		No. (and %) of Days > 32 °C During Initiation for		No. of Field Crosses Made
	Range	Average	Range	Average	> 0.5 hours	> 5 hours	
2011	25.8 - 34.5	30.9	22.0 - 25.0	23.6	12 (48%)	6 (24%)	346
2012	28.5 - 34.0	31.7	21.2 - 24.2	23.0	9 (36%)	2 (8%)	705
2013	28.9 - 36.3	32.5	21.2 - 25.4	23.5	16 (64%)	3 (12%)	455
2014	27.8 - 34.3	31.0	20.0 - 24.8	22.9	7 (28%)	0 (0%)	879
2015	30.1 - 39.9	34.8	20.1 - 24.5	22.8	22 (88%)	18 (72%)	-

(Max. temps 94 to 104 °F)

SRA field crossing is opportunistic!

Photoperiod Facility (PF) Investment

Capital costs of PFs AUD$2M (~US$1.6M)

- PF(A)
  - Built in 1986 at cost of AUD$250K (~US$195K) (SRA funded)
- PF(B)
  - Built in 1998 at cost of AUD$500K (~US$400K) (SRDC funded)
- PF(C)
  - Built in 2008 at cost of AUD$1.2M (~US$940K) (QLD Govn't funded)

PF crossing strategies

- Strategic crossing now possible
- PFs used for routine crossing since1996 (> 90% of parents now flower; up to 1,500 crosses made annually)

Objective	Aim
Shy	• Non-flowering clones and shy parents crossed with each other or proven parents
Early x Late	• Manipulate floral initiation to synchronise flowering of early and late parents
Foreign	• Foreign clones which haven't flowered in 2 consecutive years; historically 50% commercial varieties have one foreign parent
Introgression	• Develop germplasm from wild relatives, particularly *Erianthus* spp and *Saccharum spontaneum*
Disease	• To improve disease resistance of the population to major diseases including Pachymetra root rot and smut