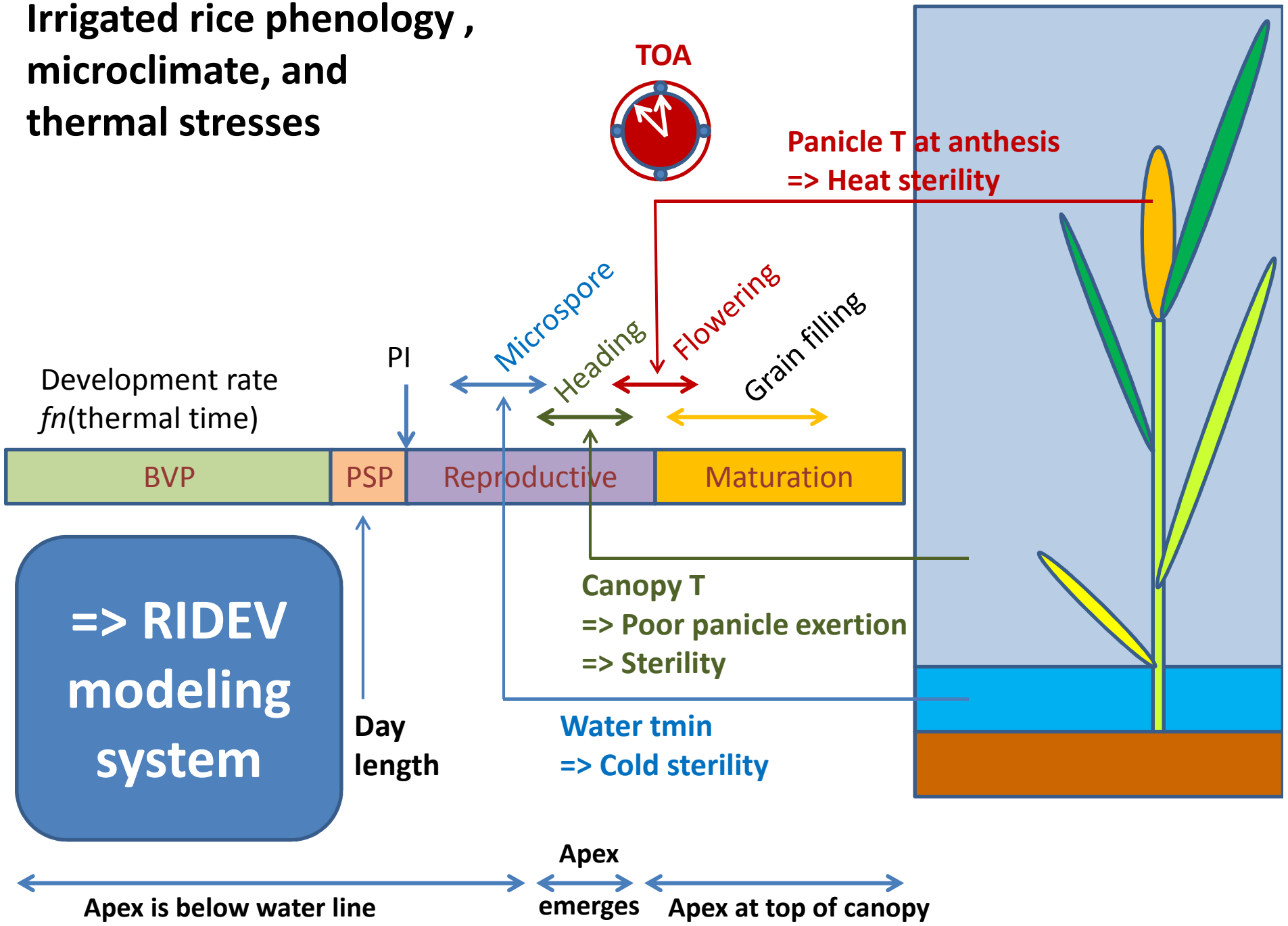
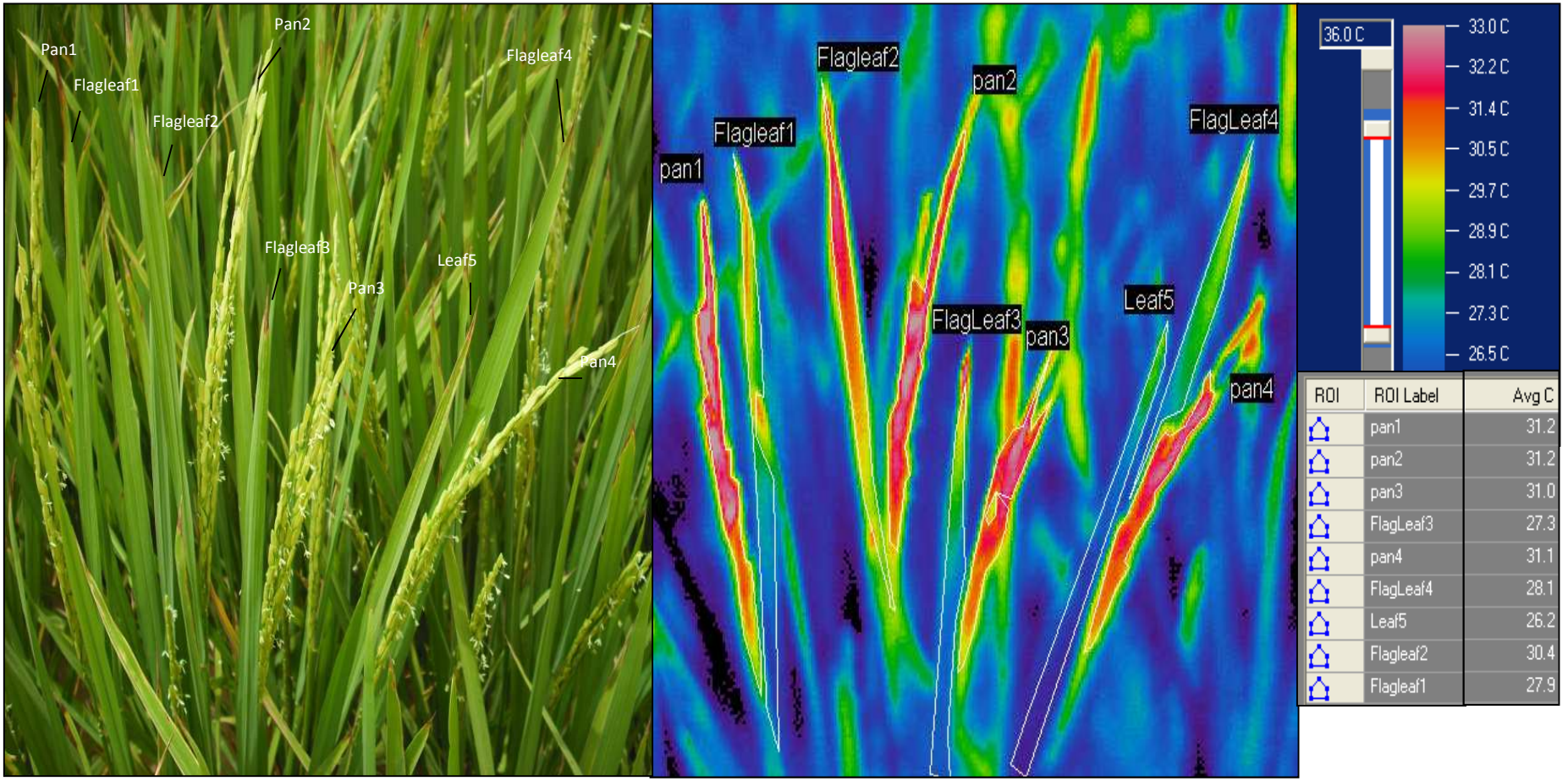
Irrigated rice phenology , microclimate, and thermal stresses



Panicle temperature: Study in Senegal, Philippines, France



ROI	ROI Label	Avg C
	pan1	31.2
	pan2	31.2
	pan3	31.0
	FlagLeaf3	27.3
	pan4	31.1
	FlagLeaf4	28.1
	Leaf5	26.2
	Flagleaf2	30.4
	Flagleaf1	27.9

Ca. 4900 IR observations on in-situ panicle T

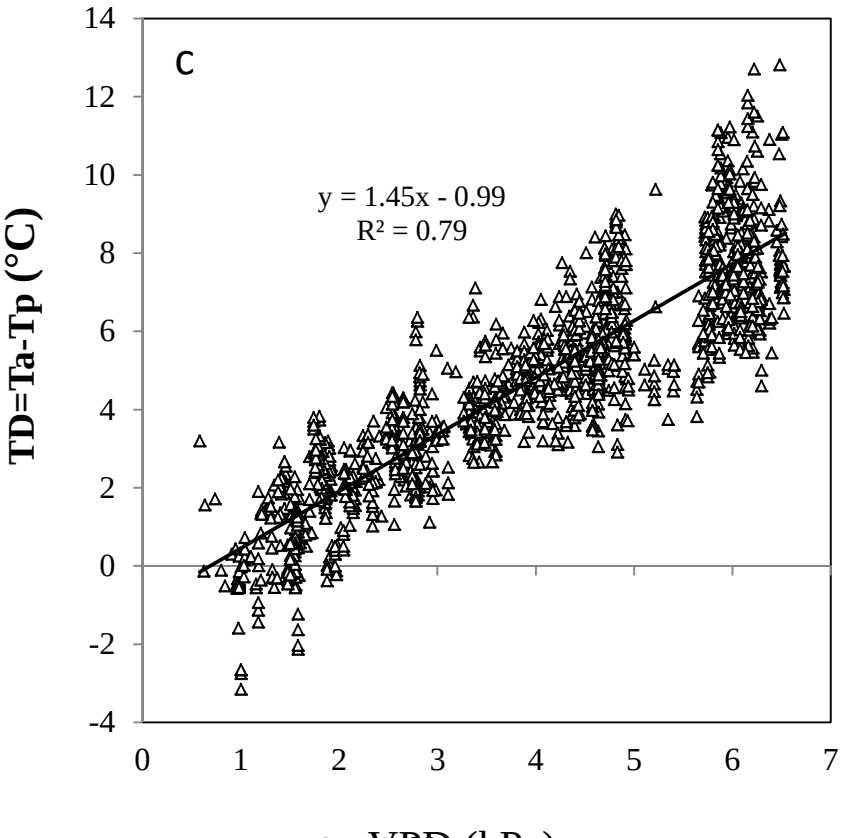
Microclimate recording

Agronomic observations incl. %sterility

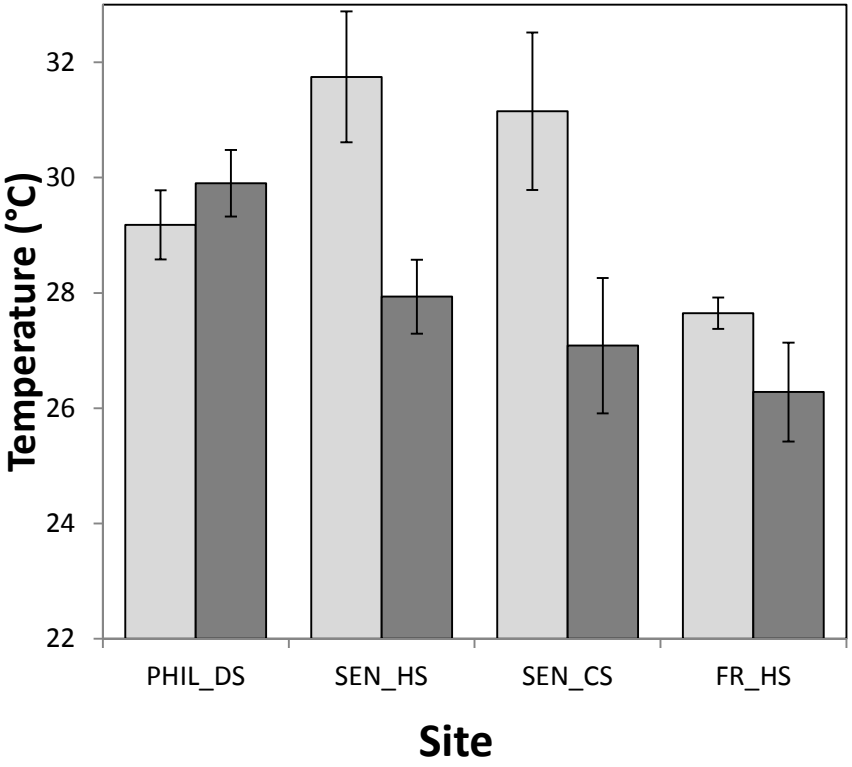
VPD reduces panicle-T due to transpiration cooling

=>

Panicles are warmer in Philippines than Senegal despite cooler climate



Tair-Tpanicle difference vs. VPD: Example of Senegal cool-dry season



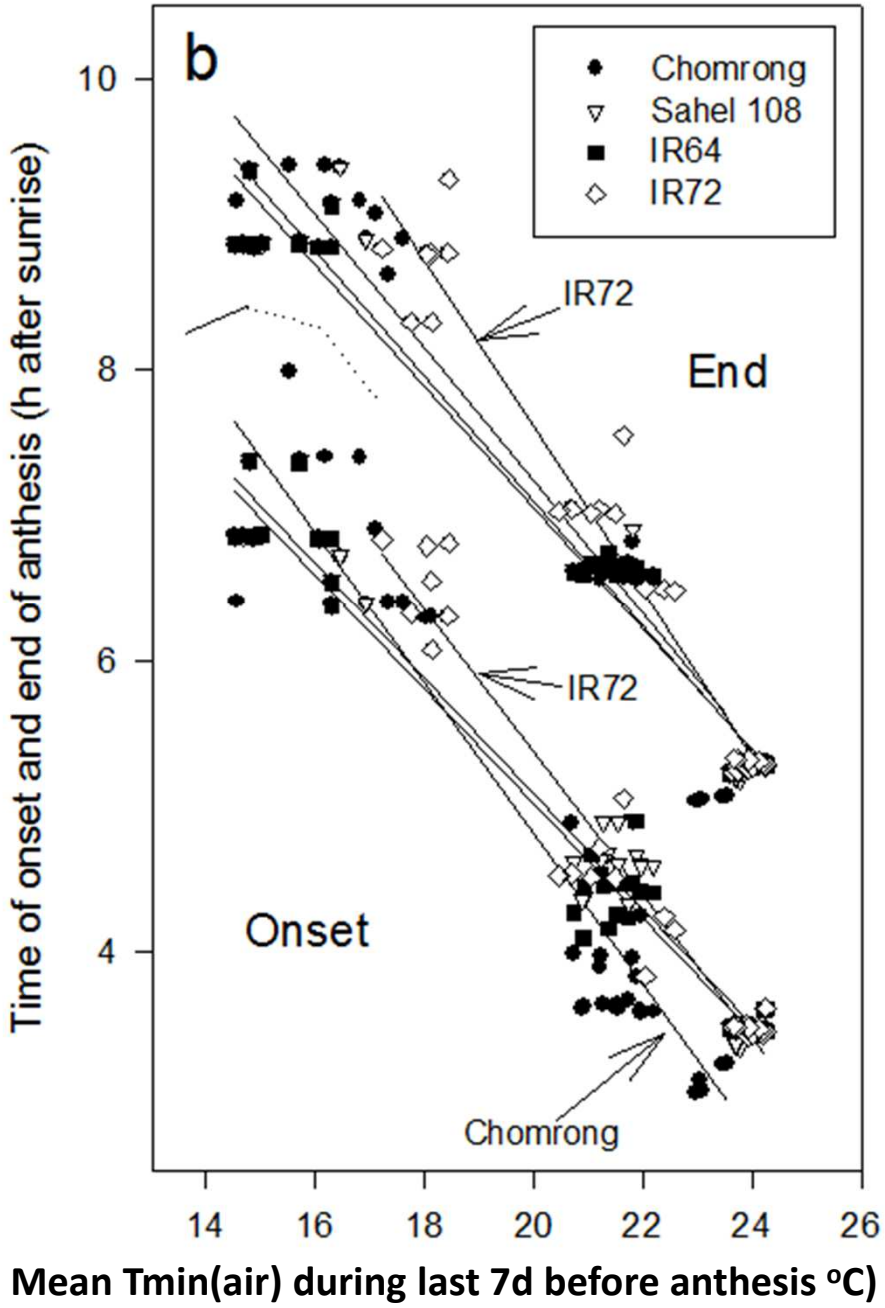
Air & panicle T during the hours of anthesis (means of 4 cvs.):

- **IRRI-DS,**
- **Senegal cold season,**
- **Senegal hot seasons,**
- **France summer**

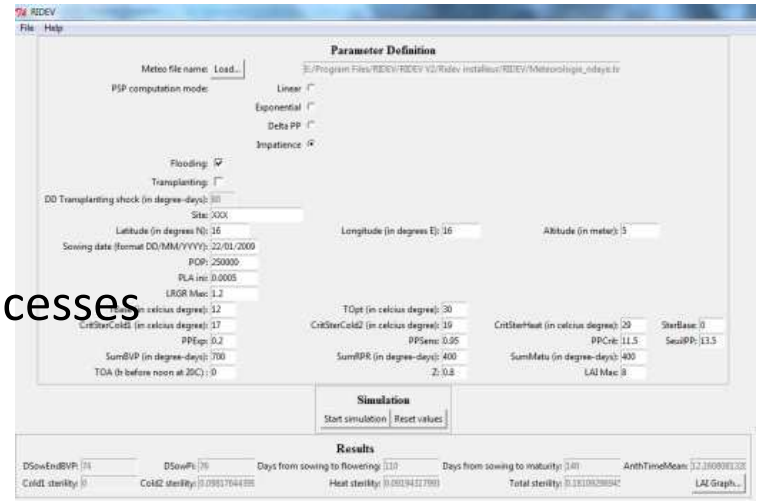
Time of day of anthesis shows adaptive plasticity

Warm nights advance TOA =>
Escape midday heat

Humid days advance TOA =>
escape heat caused by absence of transpiration cooling



RIDEV, new tool for model assisted phenotyping and prediction of T stresses



- Simulator of…
  - Phenology (microclimate & PP effects)
  - Sensitive phases to T of reproductive processes
  - G and E effects on TOA
  - Sterility caused by…
    - Chilling effects on microsporogenesis (water Tmin)
    - Chilling effects on panicle exertion (air Tmin)
    - Heat effects on pollination (Tpanicle at anthesis)
- Prediction (forward mode)
  - Agronomy, decision aide
- Heuristic parameterization of genotypes (reverse mode)
  - Phenomics (extraction of genotypic values from experimental data)