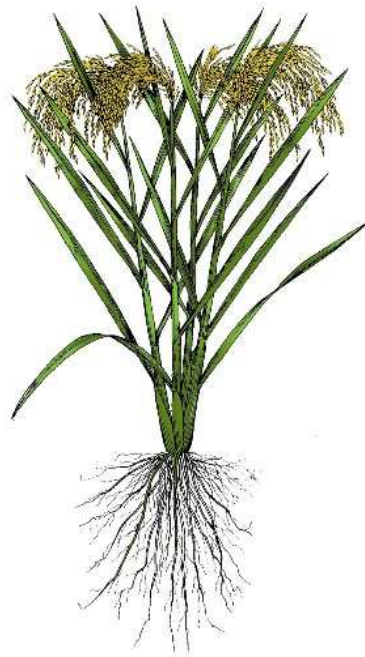


New model species

Rice



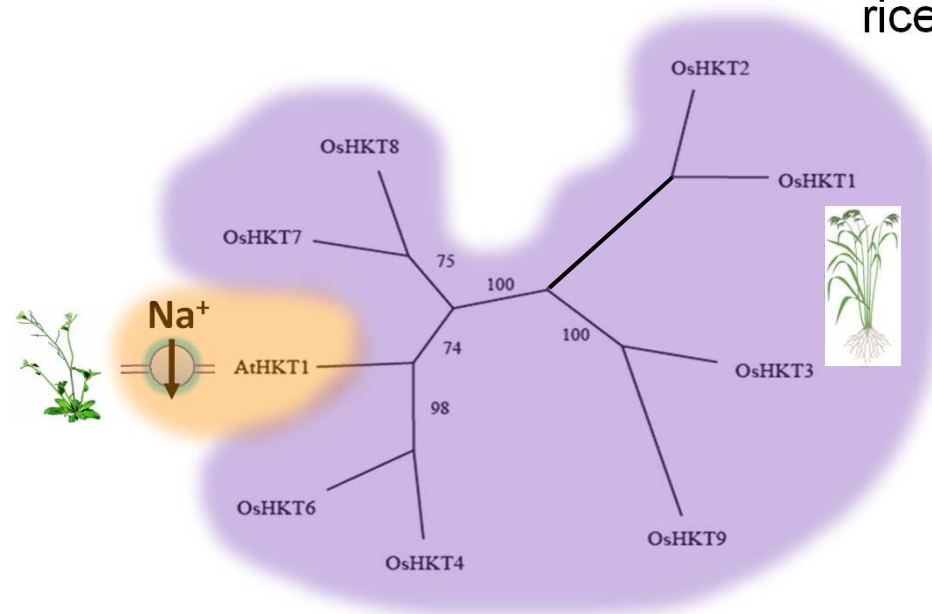
Why did I start working on rice?

- Wished to develop a project on Na^+ and K^+ transport and plant salt tolerance

An intriguing large family of Na^+ transporters in rice

rice : 9 *HKT* genes

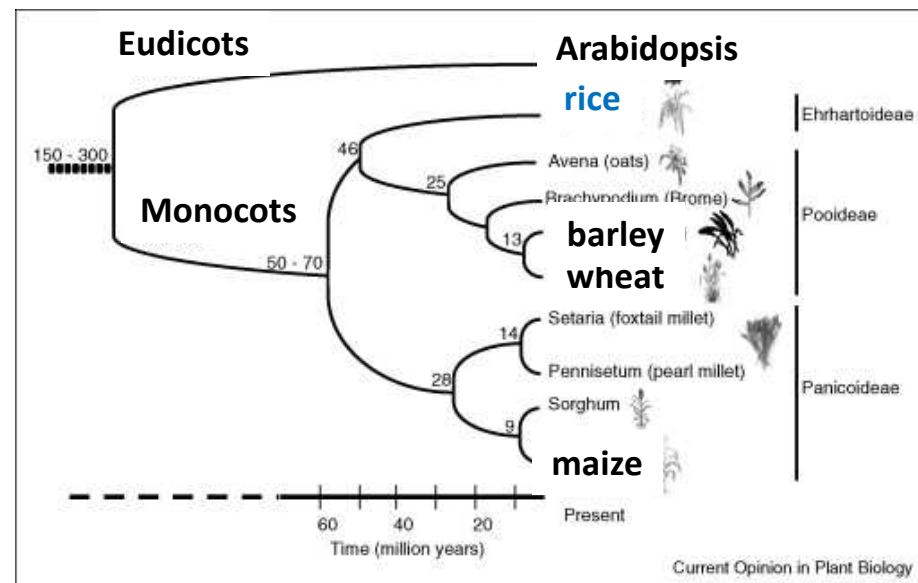
Arabidopsis : 1 *HKT* gene



- Plant of major agronomical interest worldwide:** staple food for 50% of people
- Monocot model** for molecular physiology studies
Many tools available
- Competence (possible help) in Montpellier**

Rice

- **Small diploid genome** (390 Mb, $2n=24$, ~42000 genes)
- Autogamous, **cycle of ~4 months** (2 growth campaign/year at the Cirad)
- **Two cultivated species** : *Oryza sativa* & *Oryza glaberrima*
Two *Oryza sativa* subspecies : *japonica* and *indica*
- **Large diversity** (100 000 accessions)
wide adaptability to environments and cropping systems/water regimes
- **Cultivated cereal closest to monocot ancestor**



Rice growth

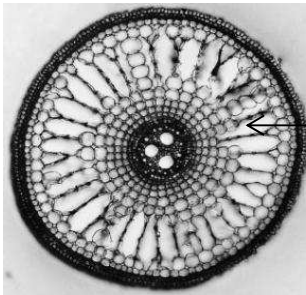
- **“ Tropical ” plant**

Optimal growth in greenhouse/phytotron 28/25 °C d/n

- **Growth in humid conditions**

Grown in soil saturated in humidity

High air hygrometry: 60-70% HR



The aerenchyma:
modified cortex
against anoxia

- **“NH₄⁺ nutrition”**

Typical growth medium: 0.7 mM NO₃⁻

1 mM NH₄⁺

- Plant dimensions: ~1m (h) x 40 cm (l)

Molecular tools & insertional mutant collections

Quite similar tools as in Arabidopsis

- High quality genome annotation
- Full length cDNA (KOME, Japan): **20000**
- Transcriptomics: Affimetrix cheaps, transcriptome, miRNA, transcription factor databases, ...

- **Insertional mutant collections**

10 international collections: **200000** FST (e.g., in 60% of *OsHKT* genes)

1 collection at the Cirad (managed by E Guiderdoni)!

3 insertional elements:

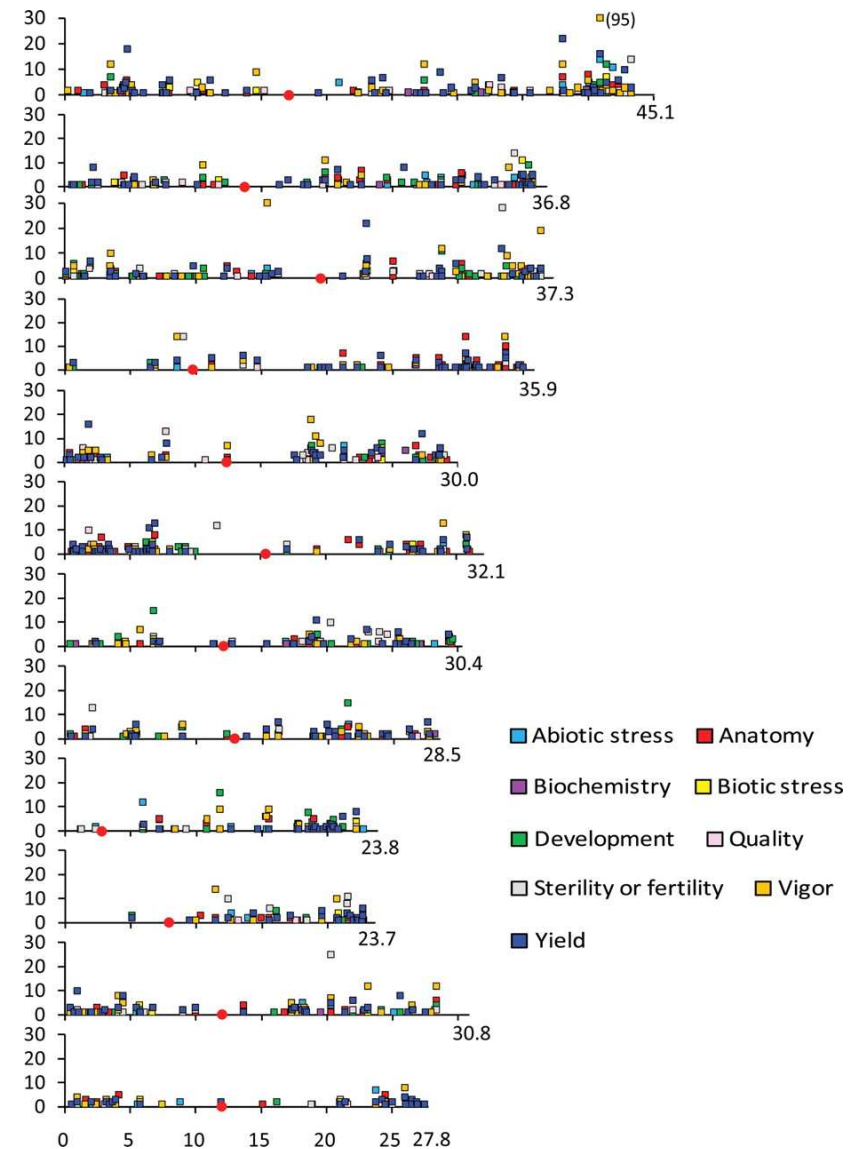
- T-DNA
- Rice *tos17* retrotransposon
- Maize *Ds* transposon

4 cultivars!

Multi-insertional mutants

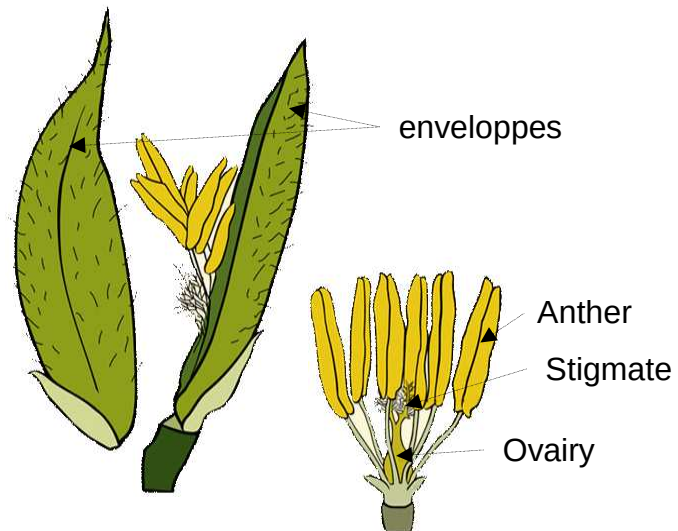
Tools for genetic studies

- RFLPs, AFLPs, SNPs, DArTs
- RILs, NILs, CSSLs, NAM, MAGIC
- TILLING
- Mapped QTLs
e.g. abiotic stress (salt, drought, cold ...)



Rice crossing

- Works well with experience

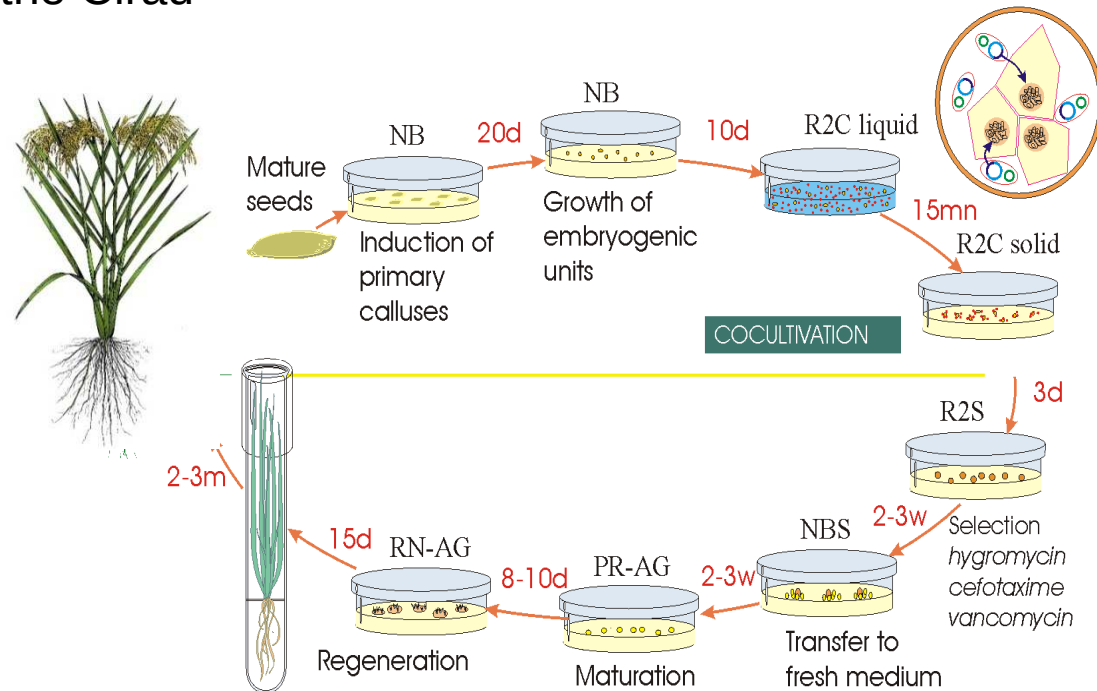


1 successfull cross: 1 grain!

Rice transformation

through *Agrobacterium tumefaciens* co-cultivation

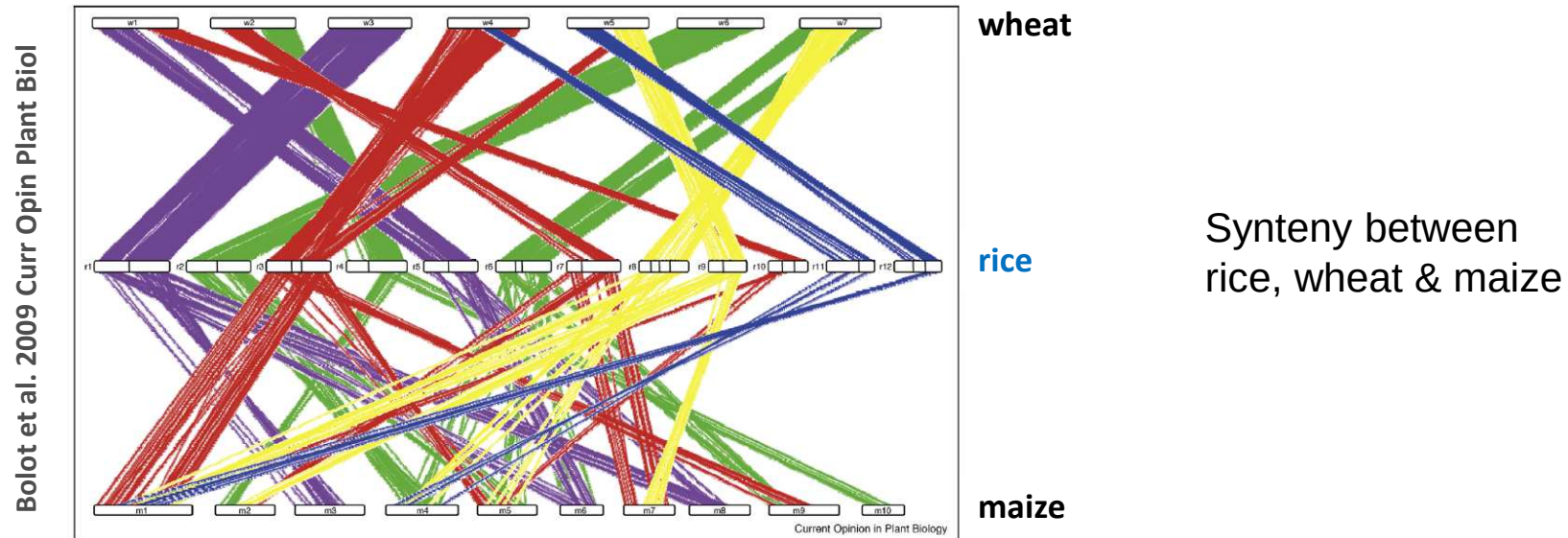
Since 1994 at the Cirad



6.5 month duration from seed to seed

Highly successfull at the Cirad

Rice as model for other cereals



Conserved positions of ortho meta QTLs across cereal genomes allows identification and cloning of agronomically important genes

e.g., concerning *HKT* genes: 1 common QTL of salt tolerance in rice & wheat