



Echinochloa crus-galli



E. phyllopogon



E. oryzoides

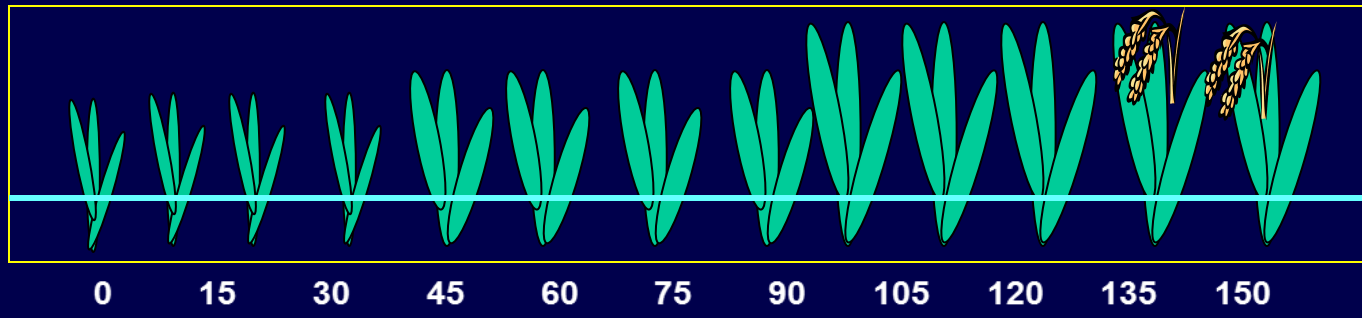
Weed Competition, Control, Timing and Herbicides

Albert Fischer
with
Whitney Brim De Forest & Jim Eckert

The Outcome of Weed Competition

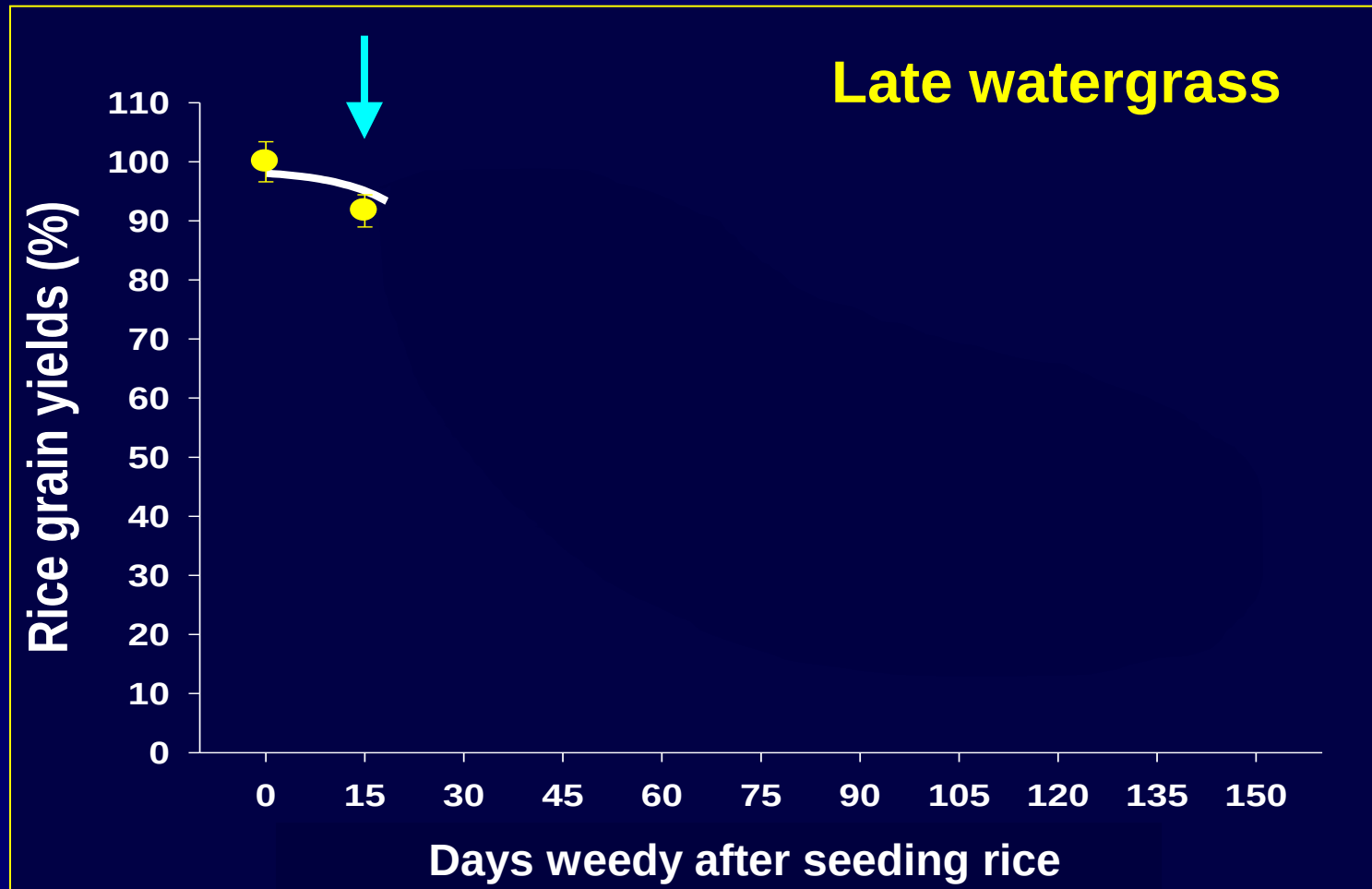
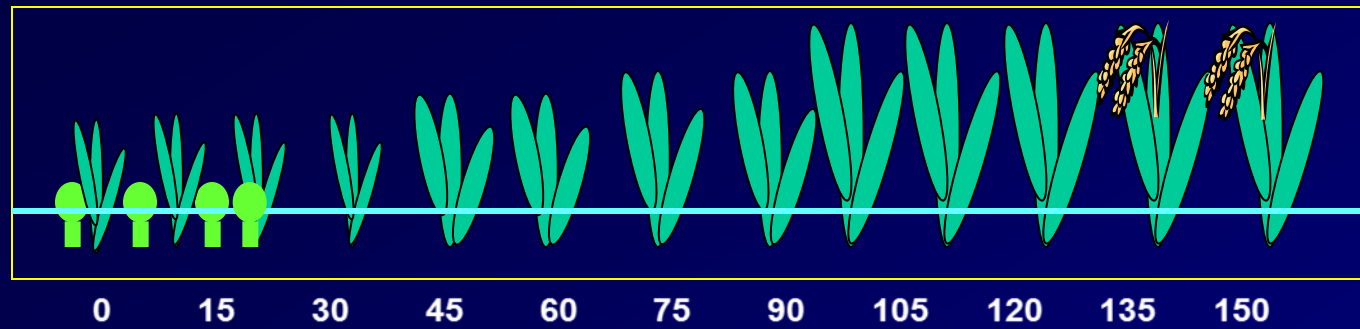
a. Time of emergence

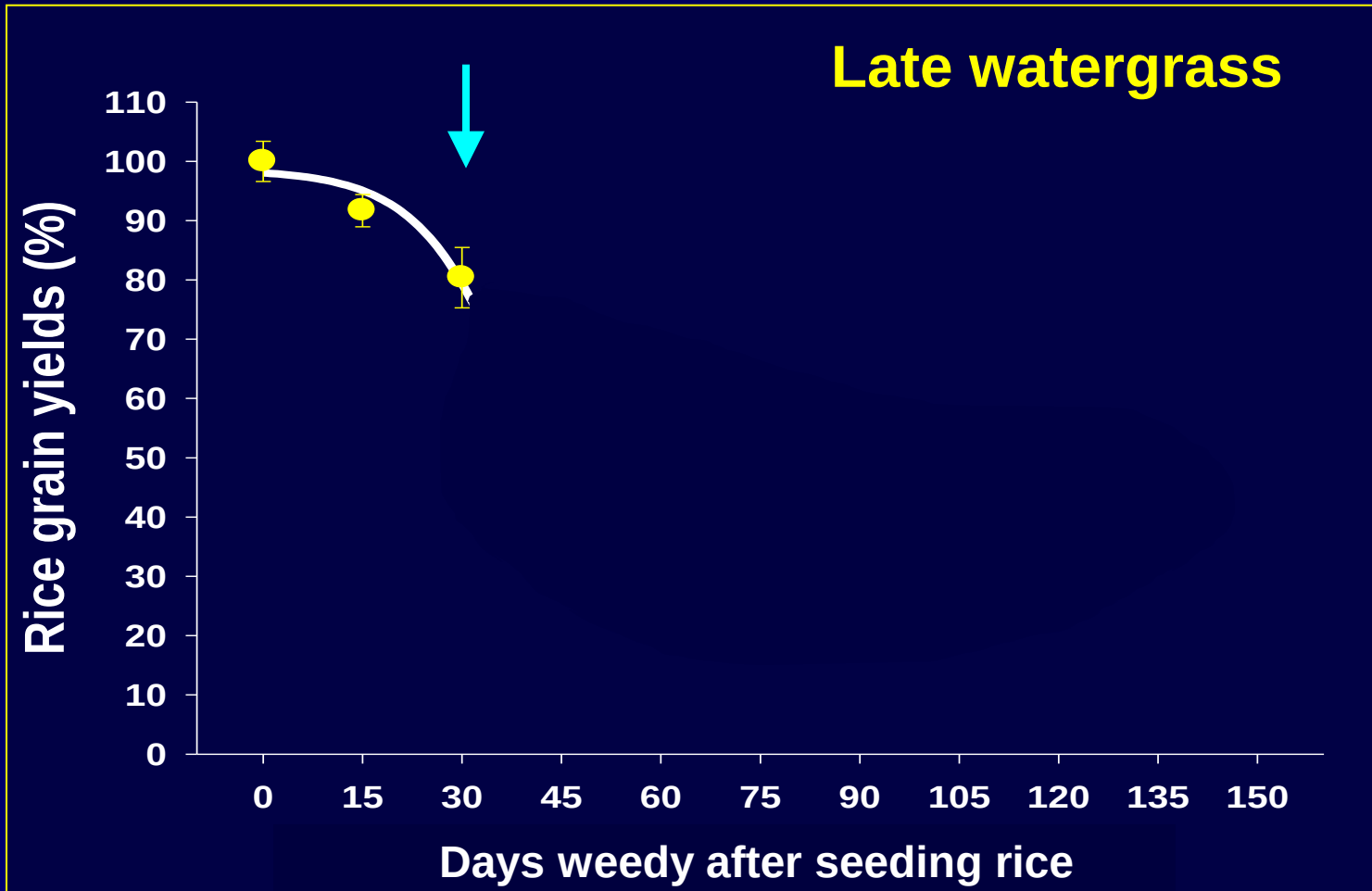
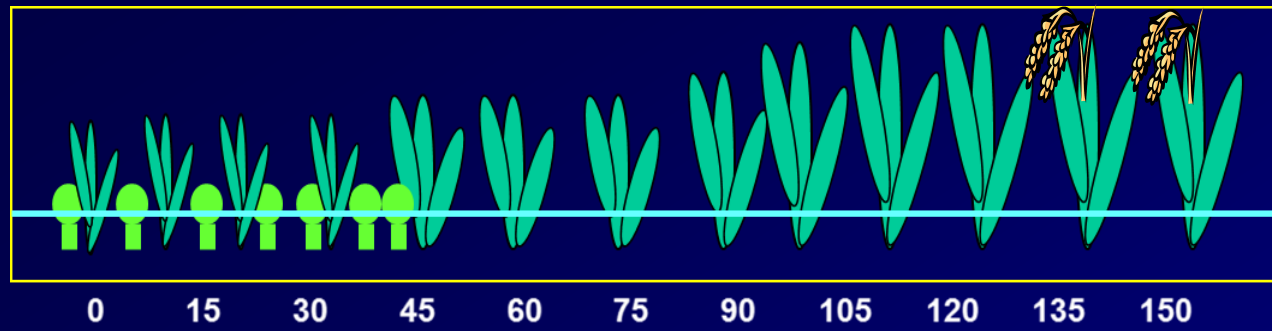
b. Duration

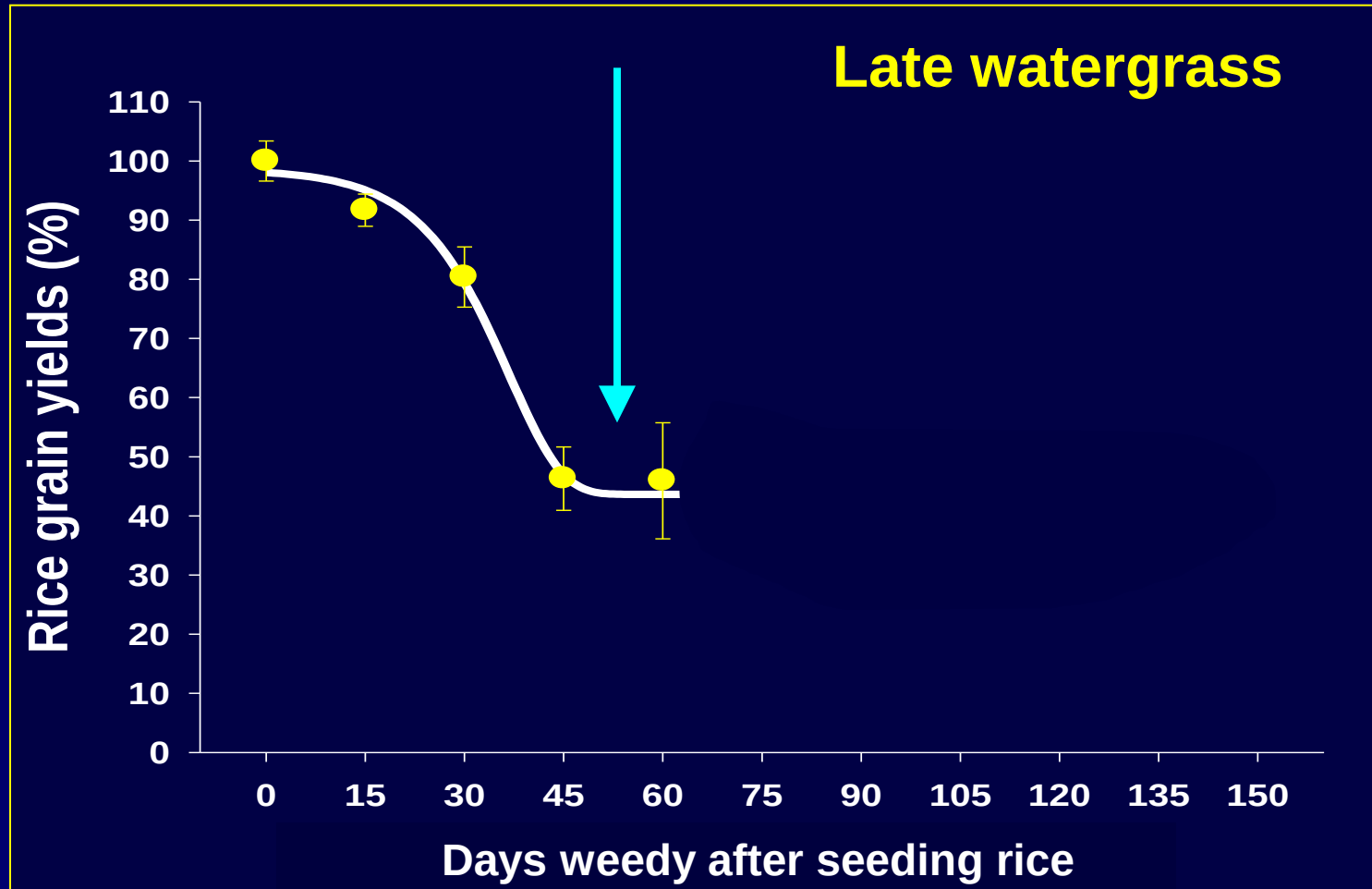
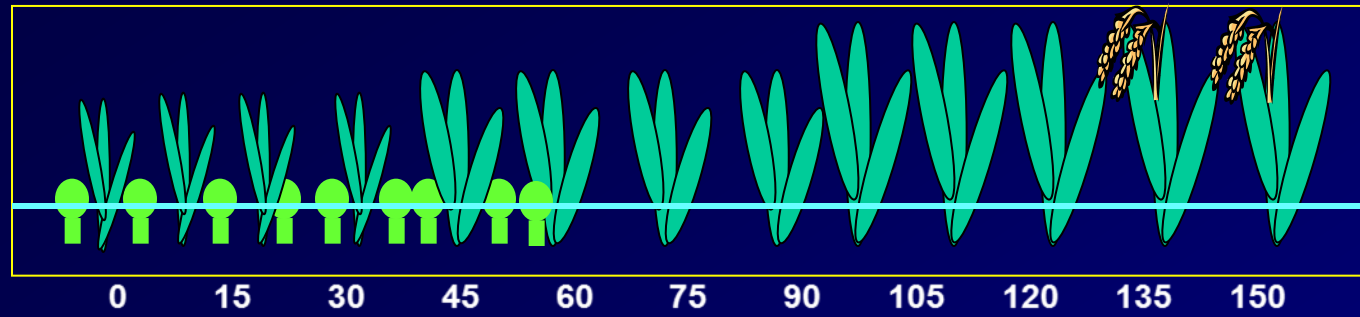


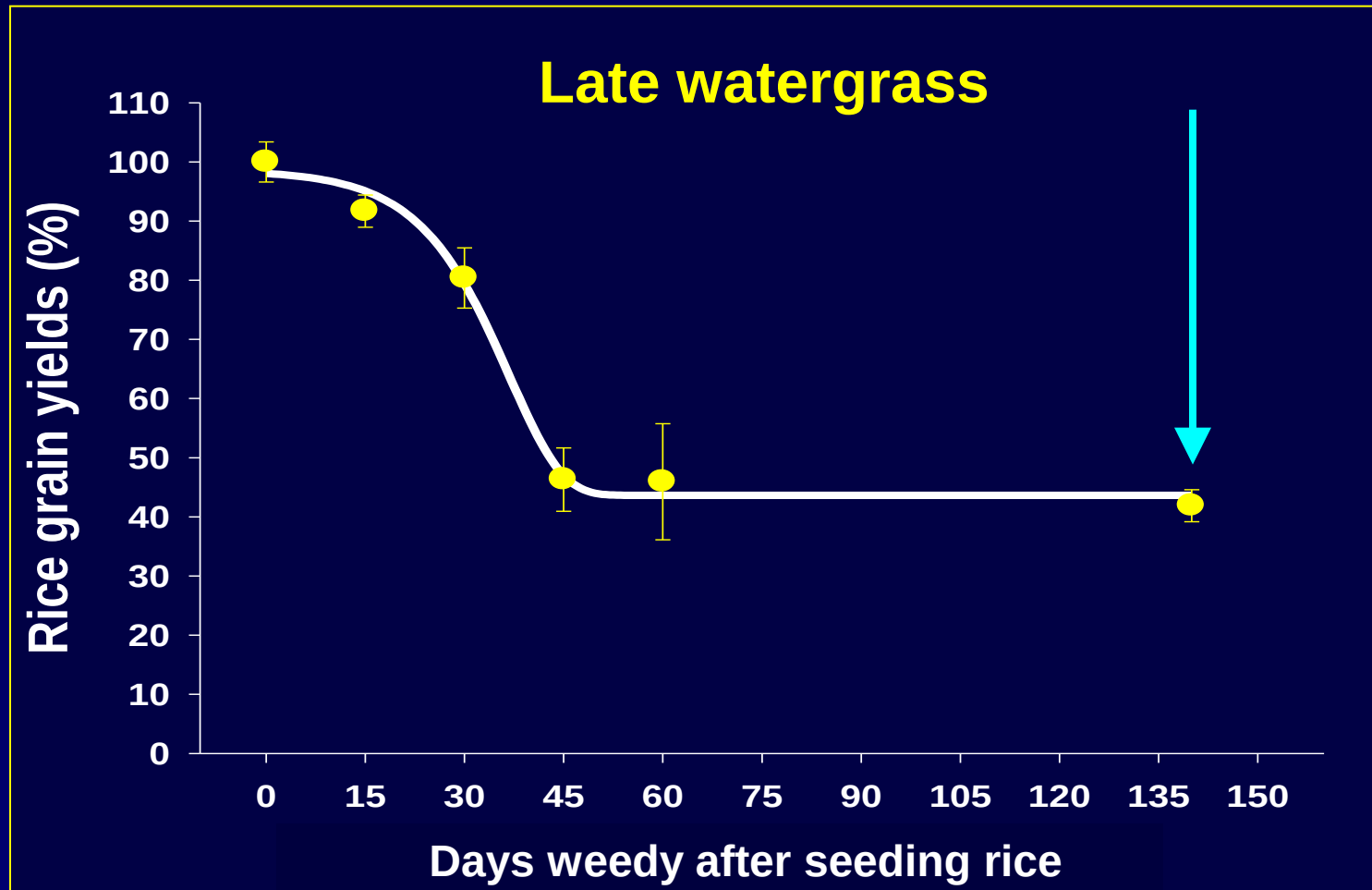
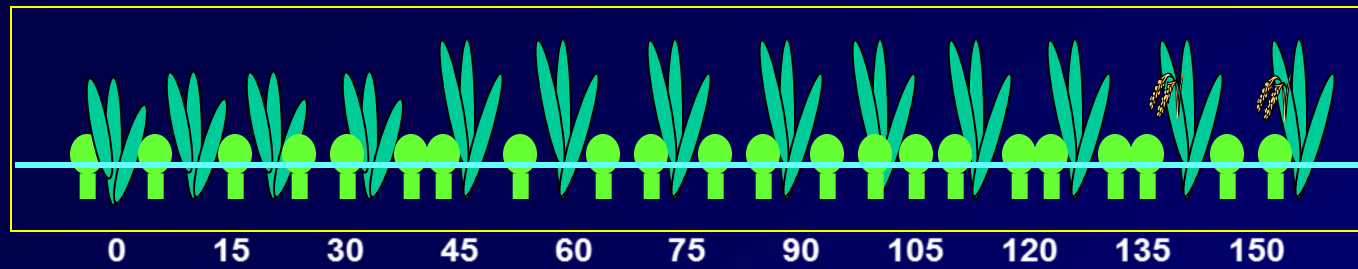
Days after seeding rice

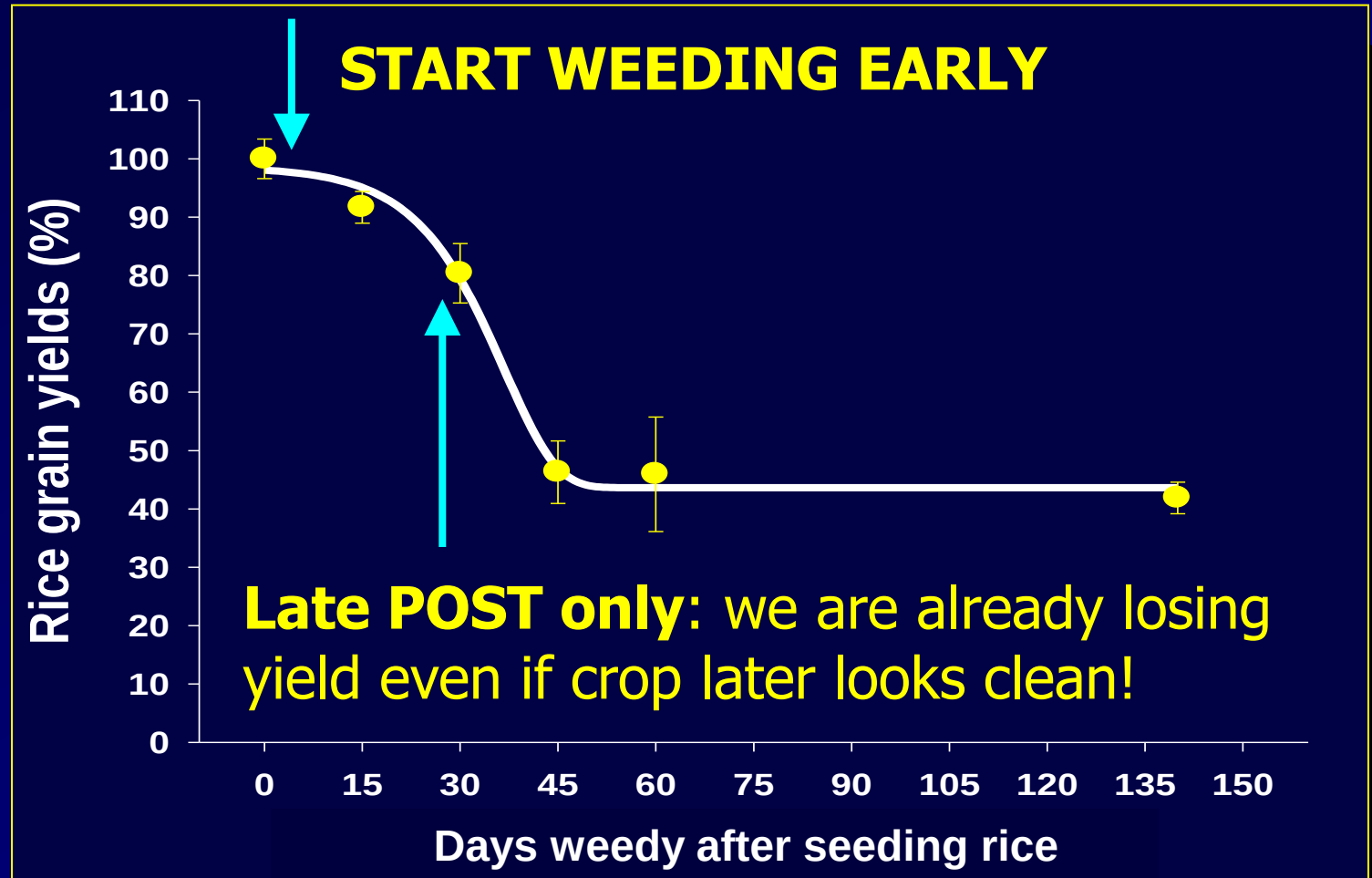
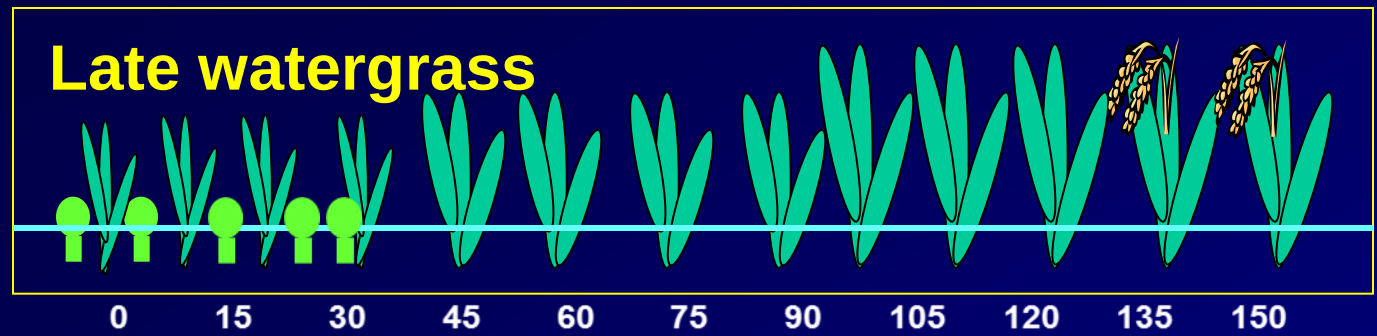




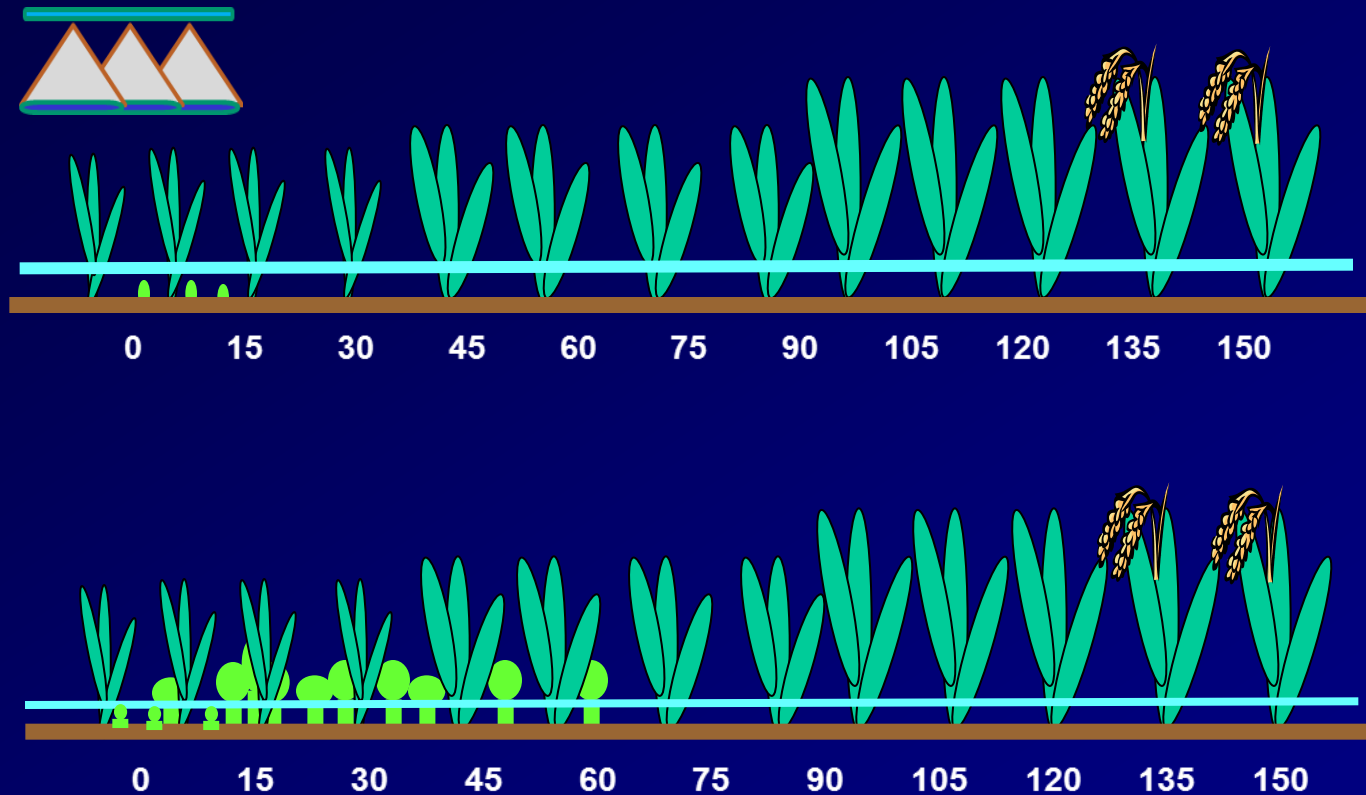








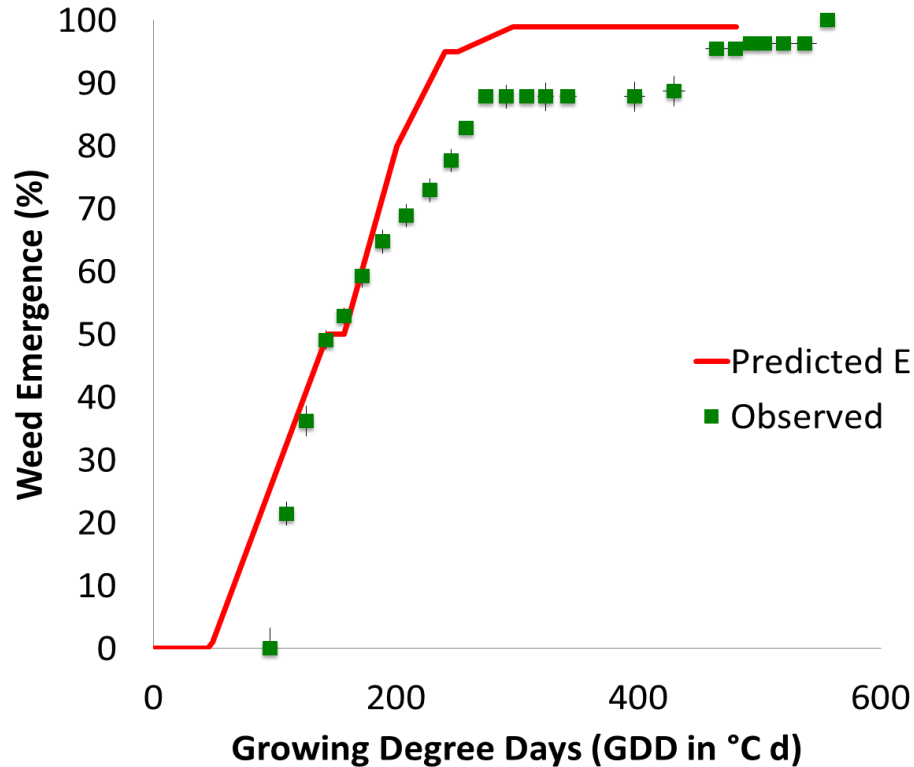
Foliar-acting herbicide



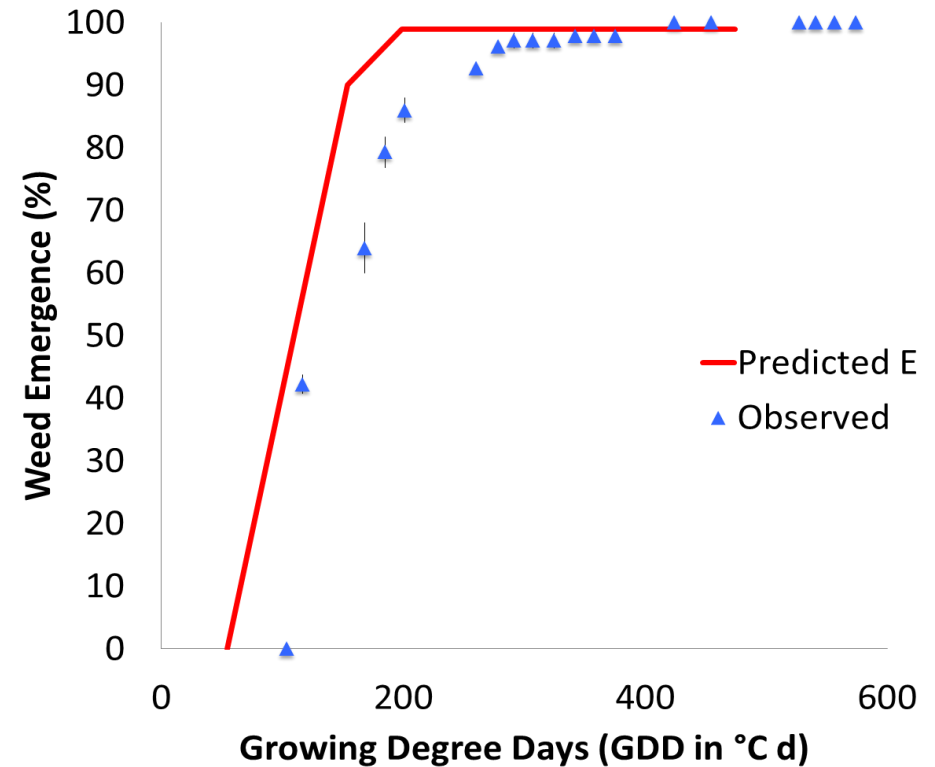
Not good, but happens fairly often 😊

Emergence of Late Watergrass from rice fields

Late Watergrass (*Echinochoa phyllopogon*):
Flushed



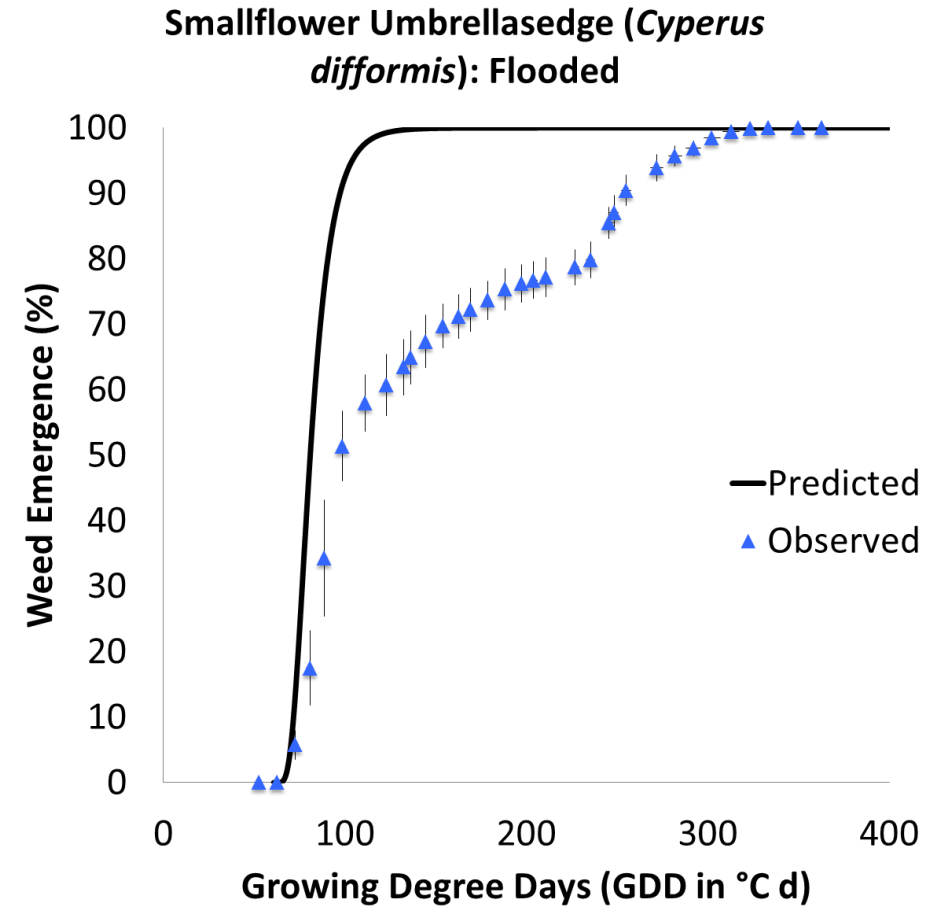
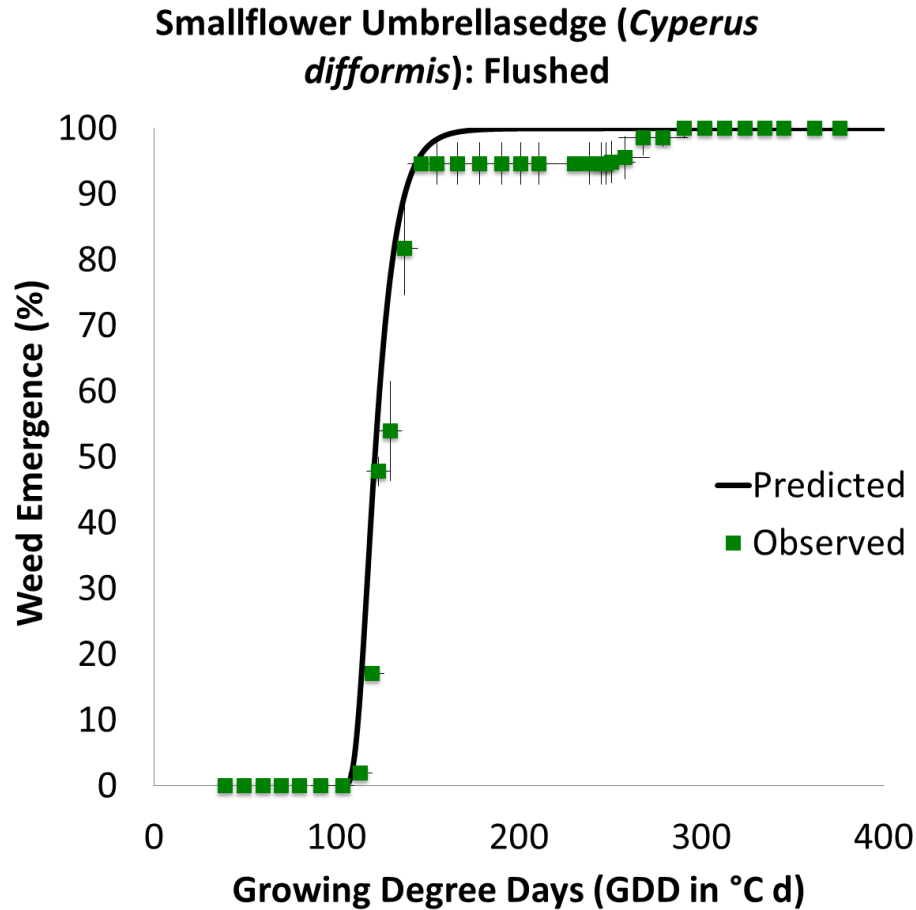
Late Watergrass (*Echinochloa phyllopogon*):
Flooded



- Growing Degree Days (°C.day):

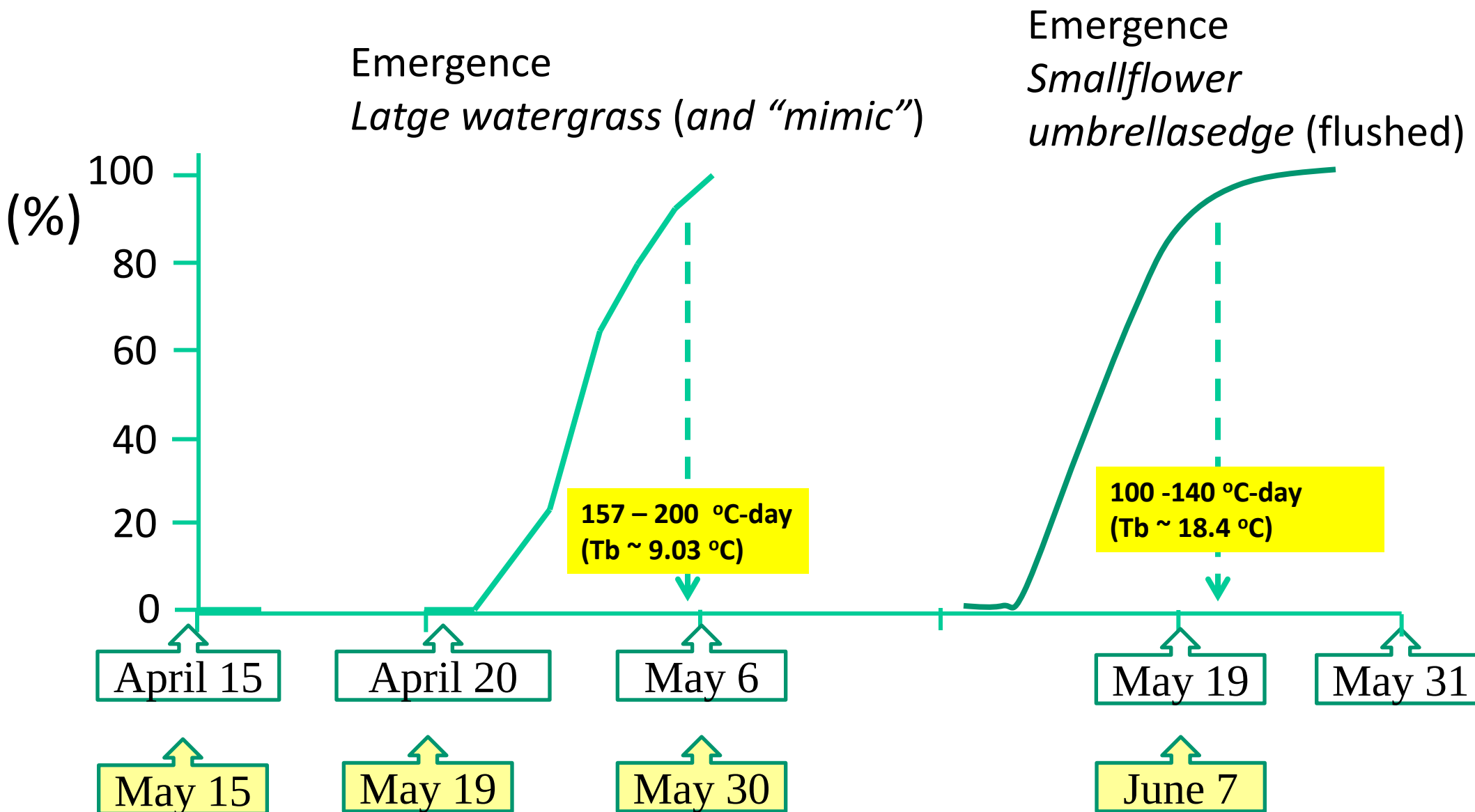
- a. Calculate the average temperature of each day (°C)
- b. Subtract the **base temperature** ($\approx 9.03^{\circ}\text{C}$)
- c. Add the results together to get accumulated Degree Days over time

Emergence of Smallflower Umbrellasedge from rice fields

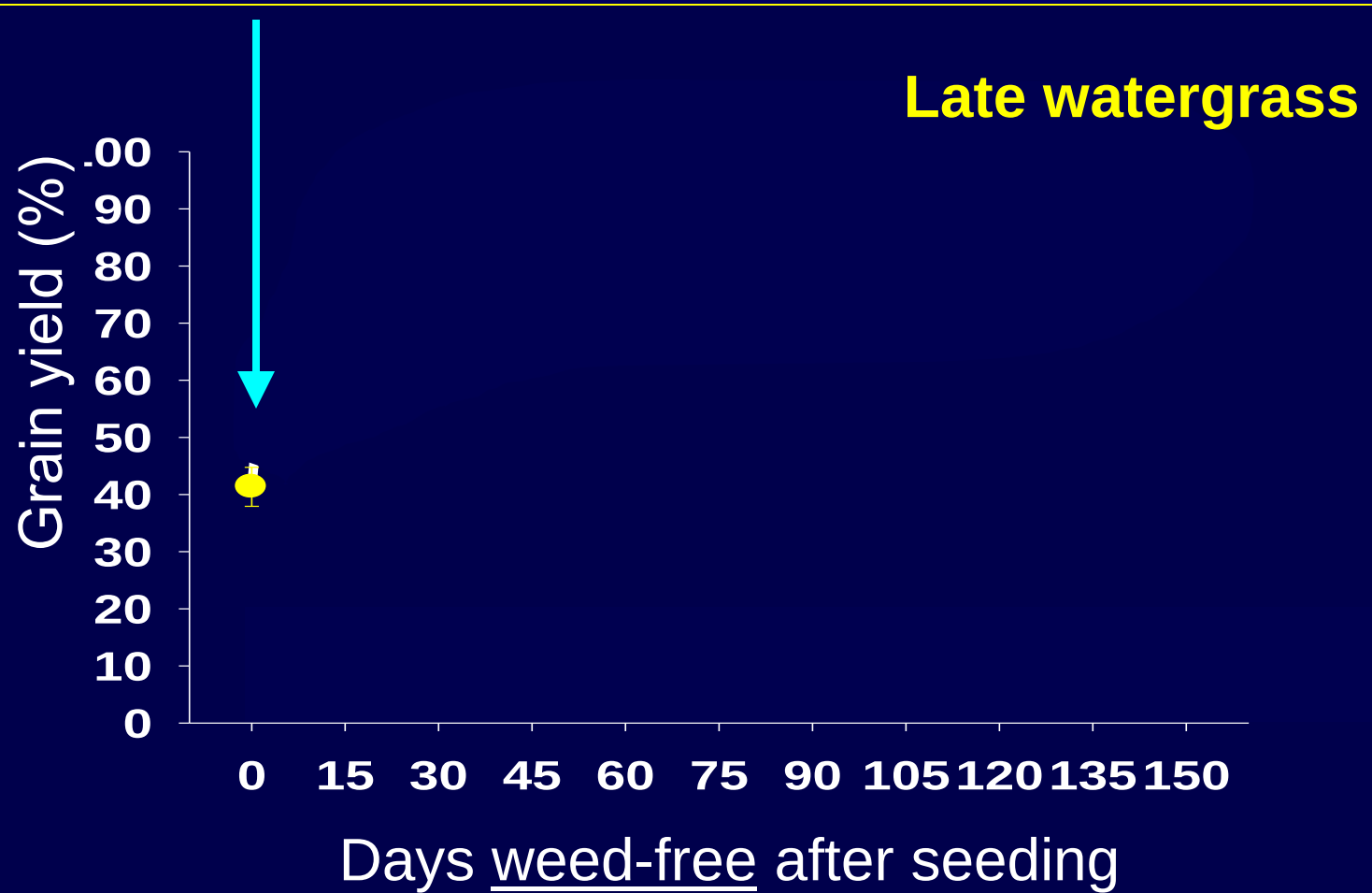
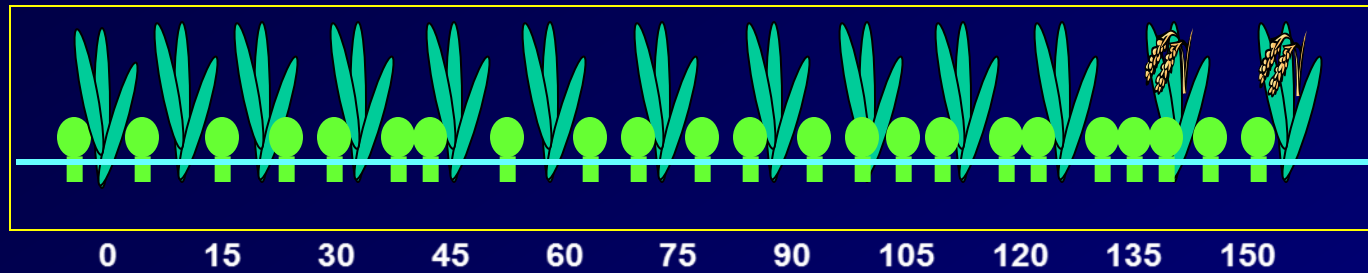


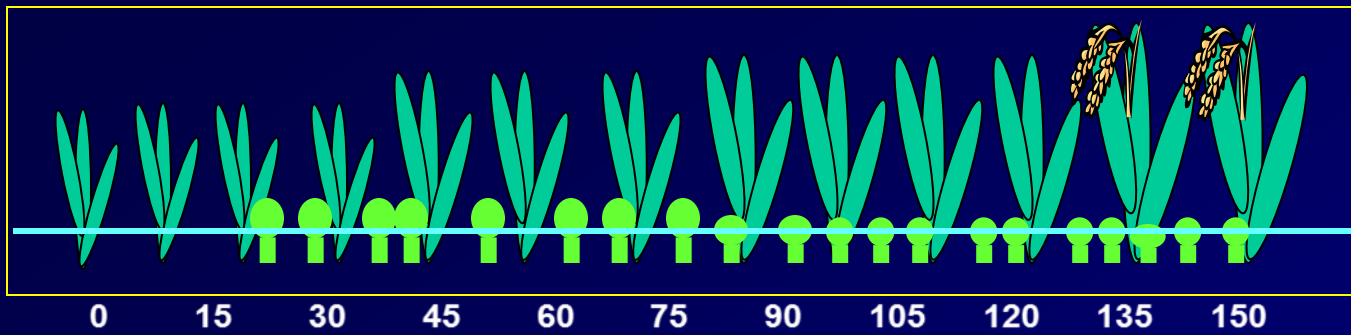
- Growing Degree Days (°C.day):

- a. Calculate the average temperature of each day (°C)
- b. Subtract the **base temperature** ($\approx 18.4^{\circ}\text{C}$)
- c. Add the results together to get accumulated Degree Days over time

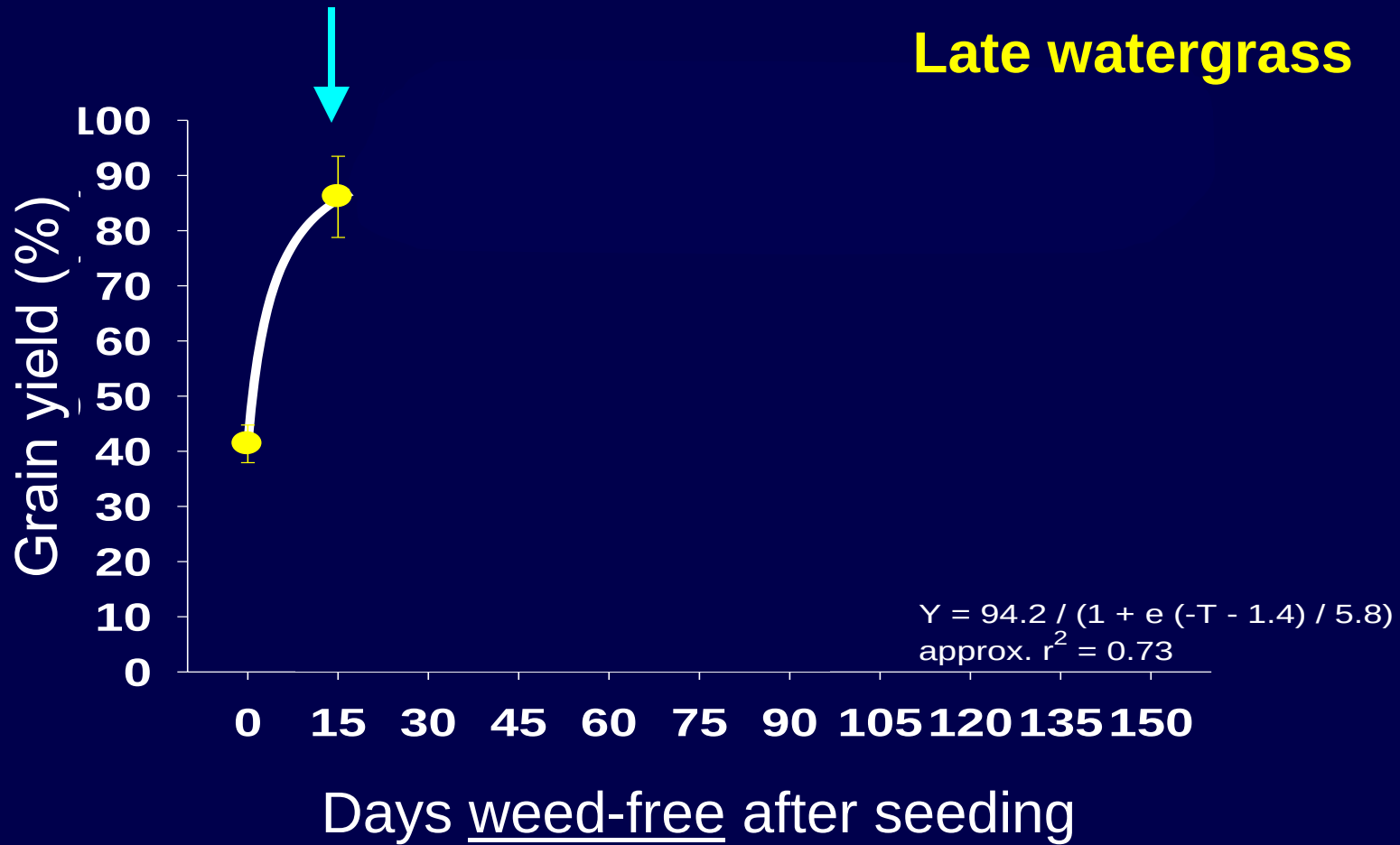


It is pretty hard to get efficacy spraying on a calendar basis

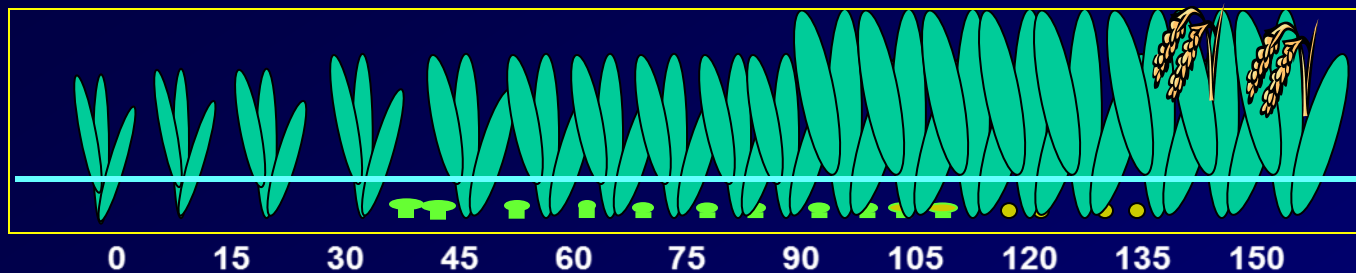




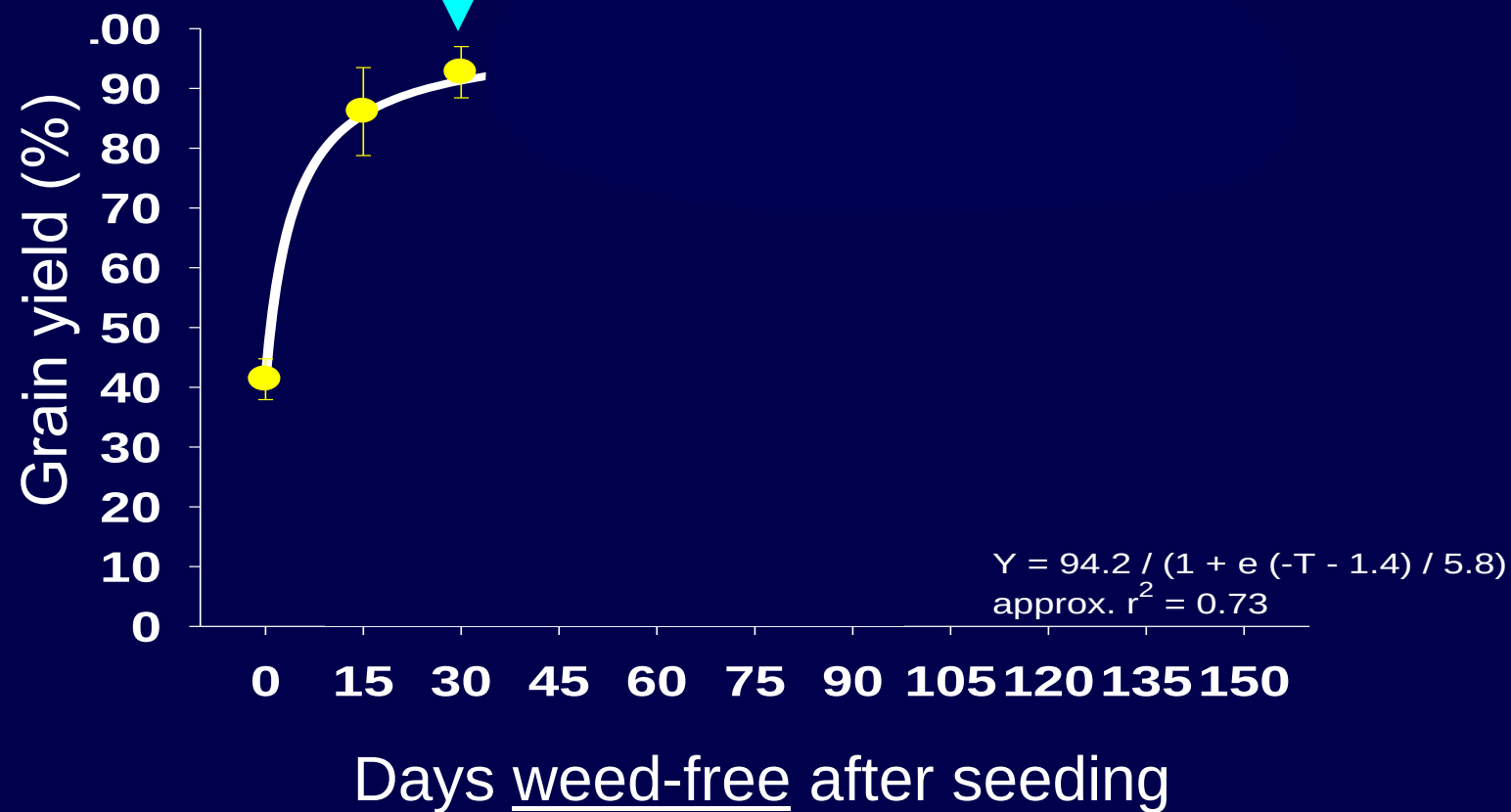
Late watergrass

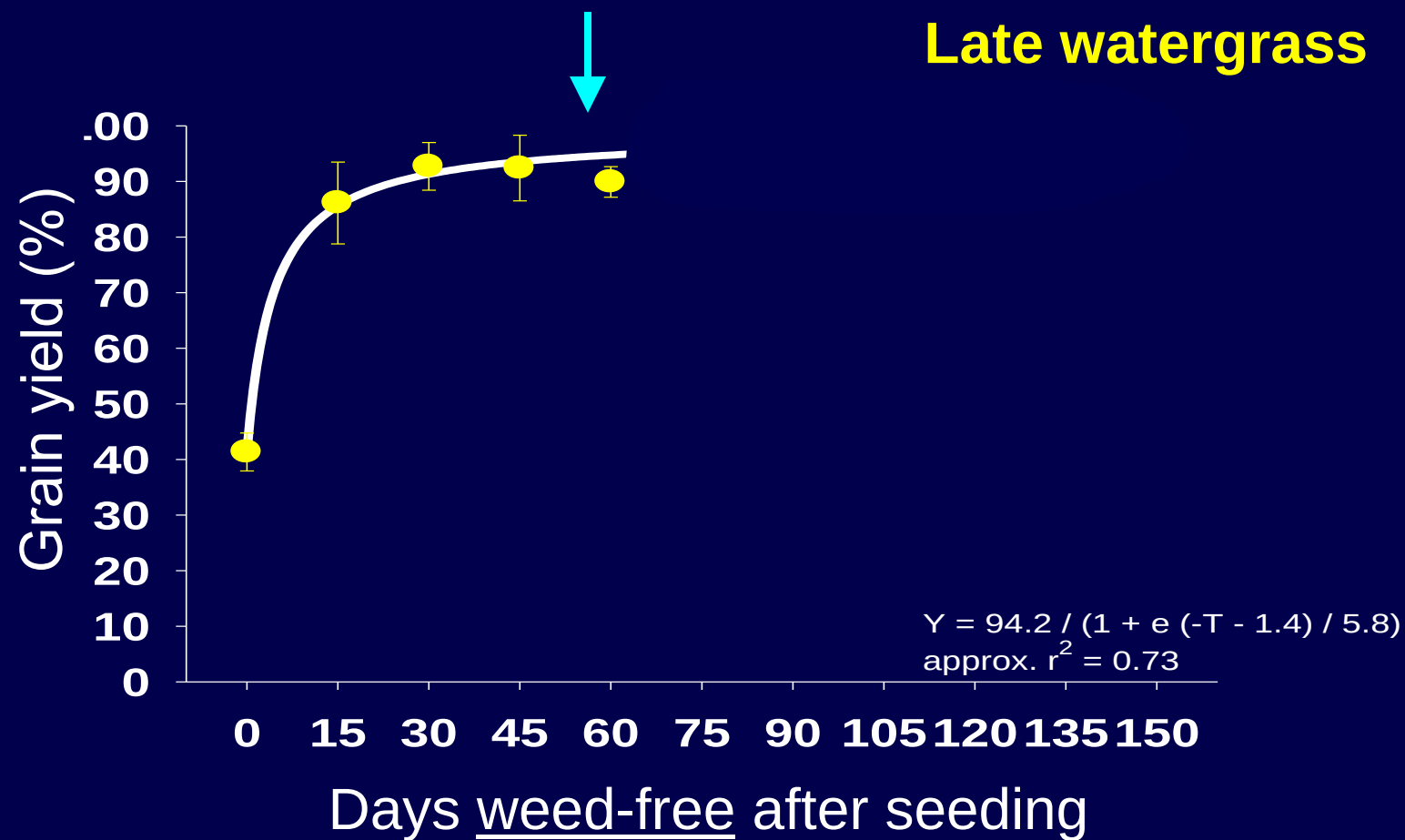
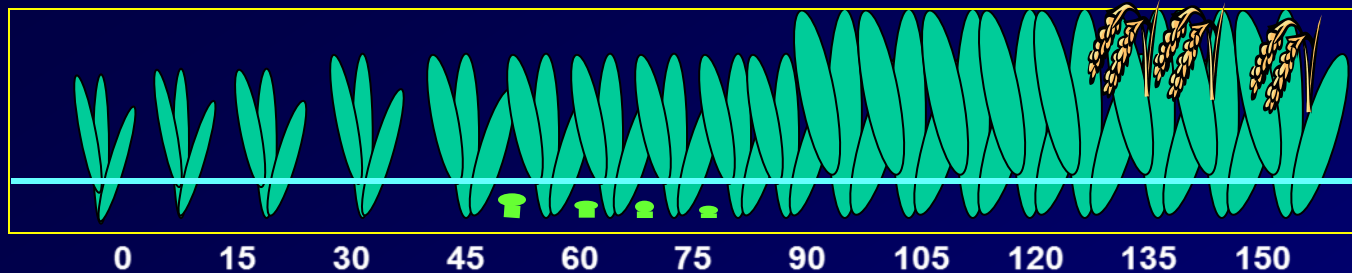


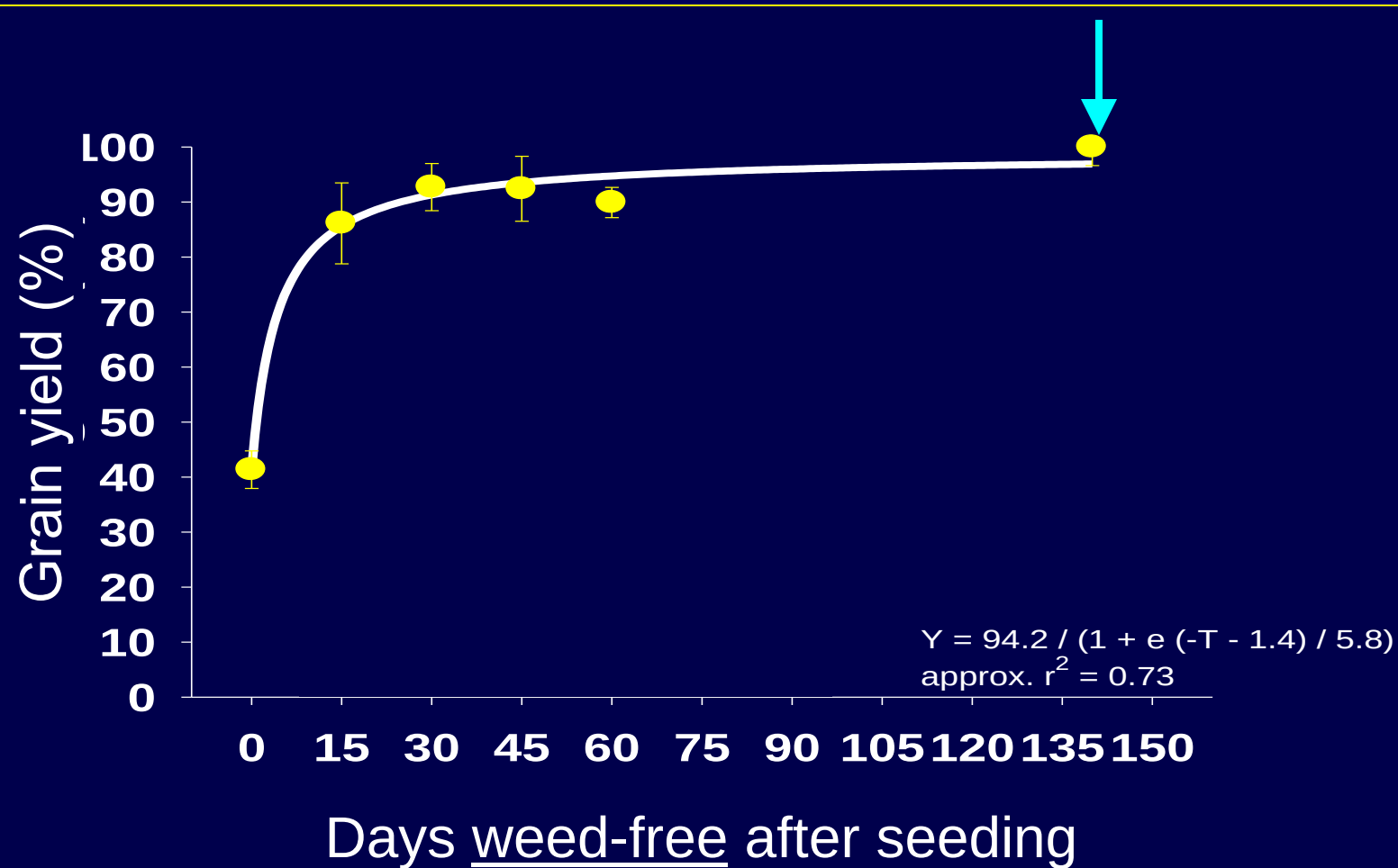
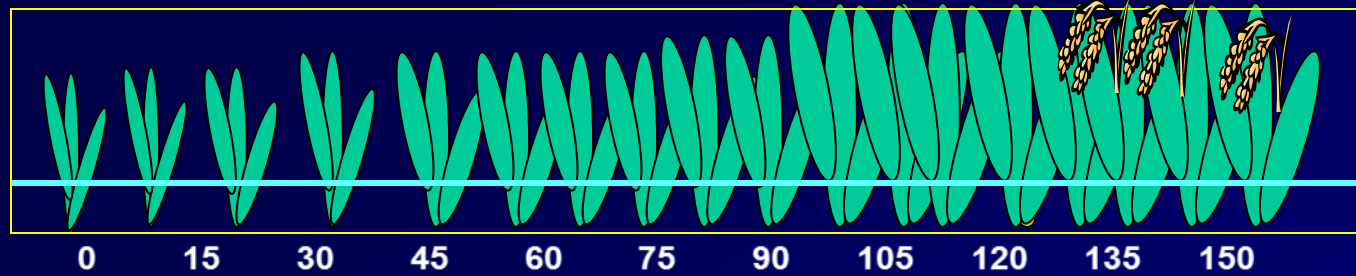


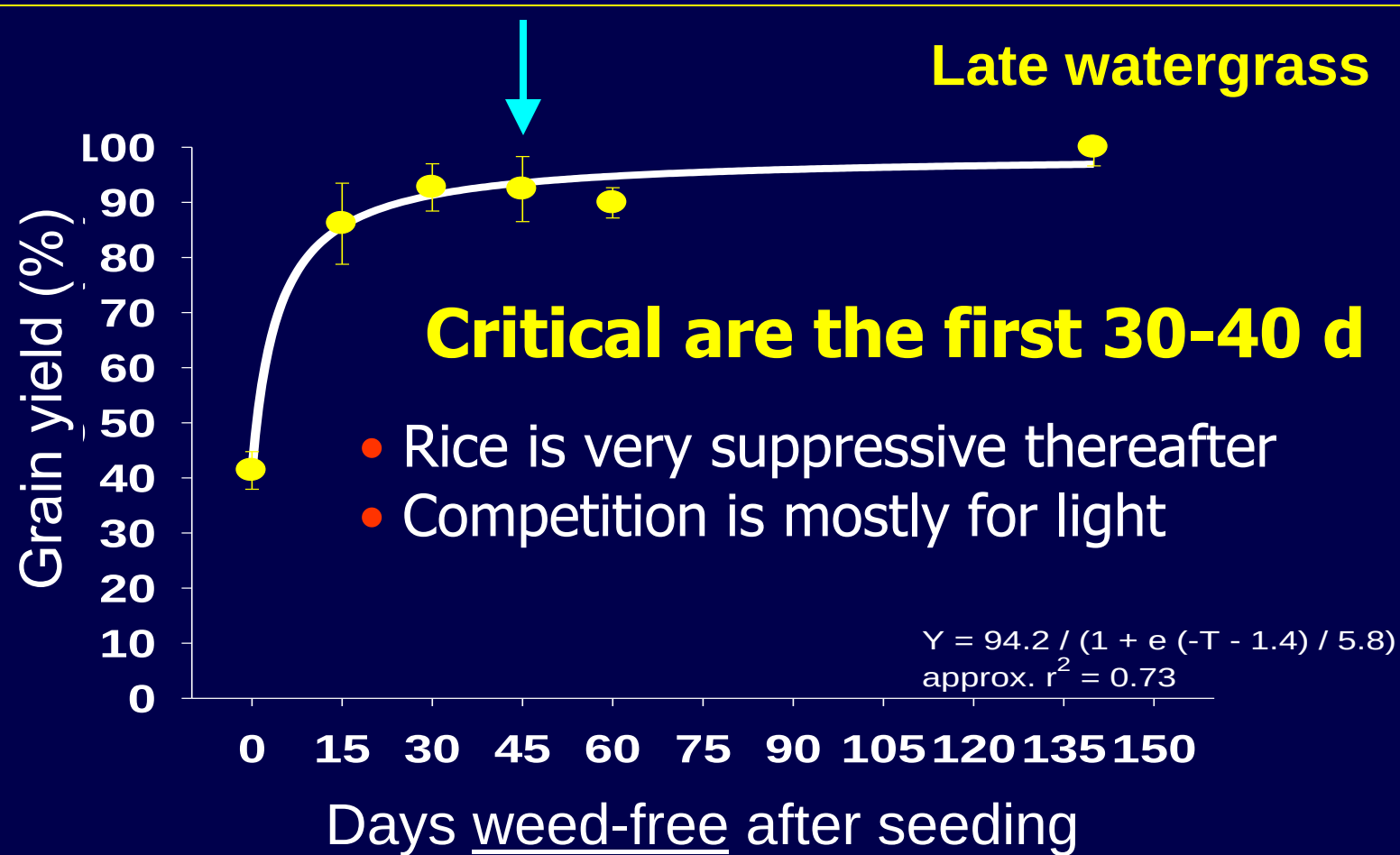
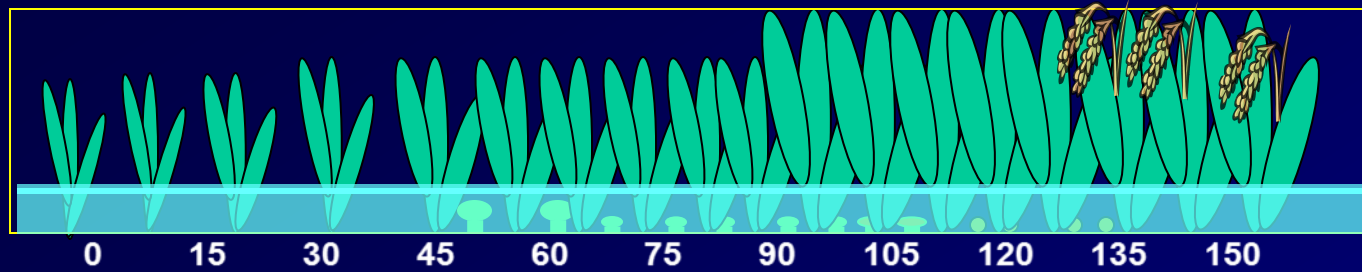


Late watergrass







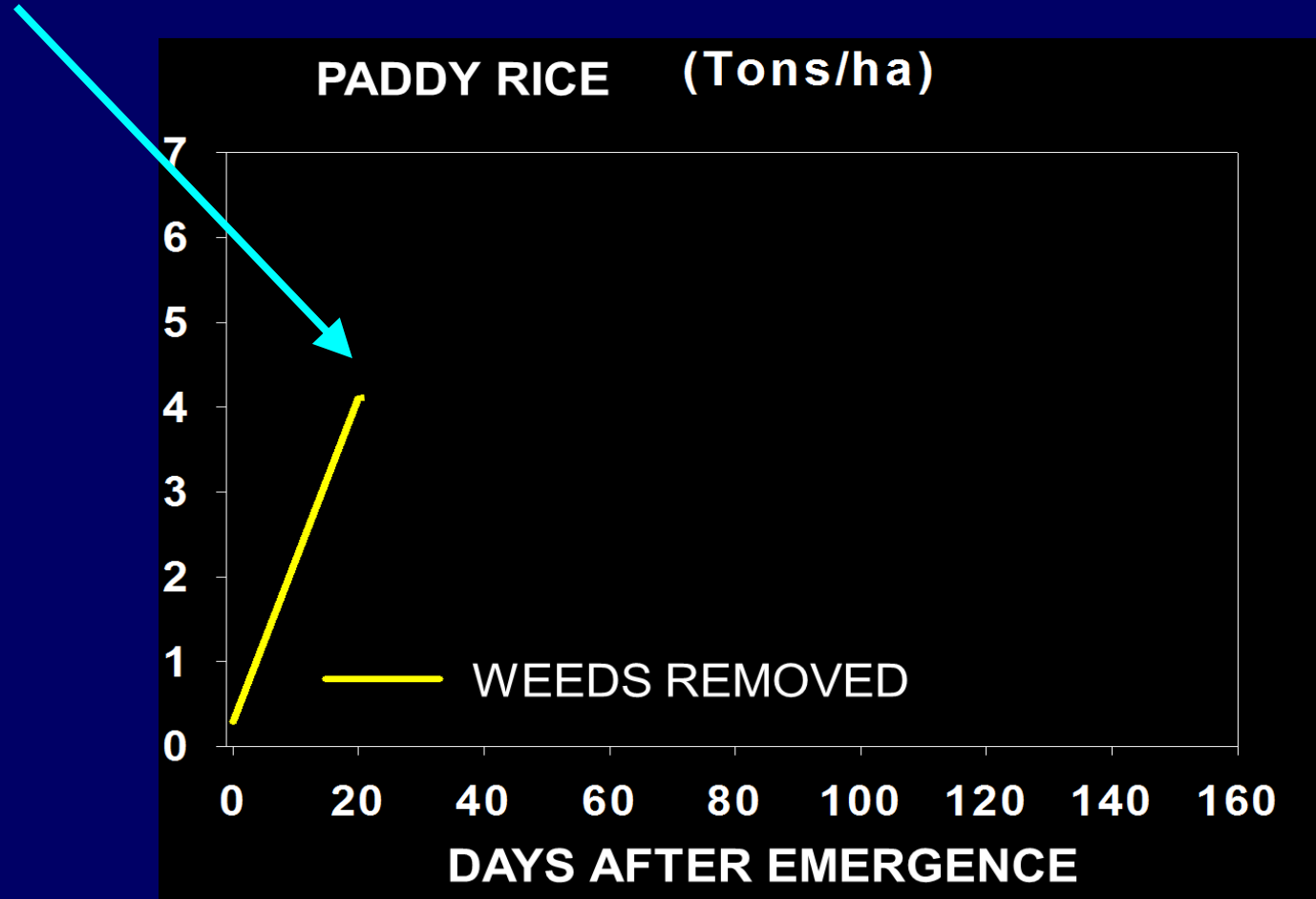
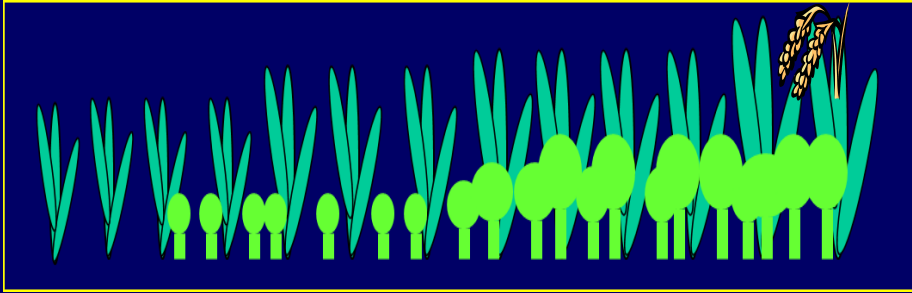


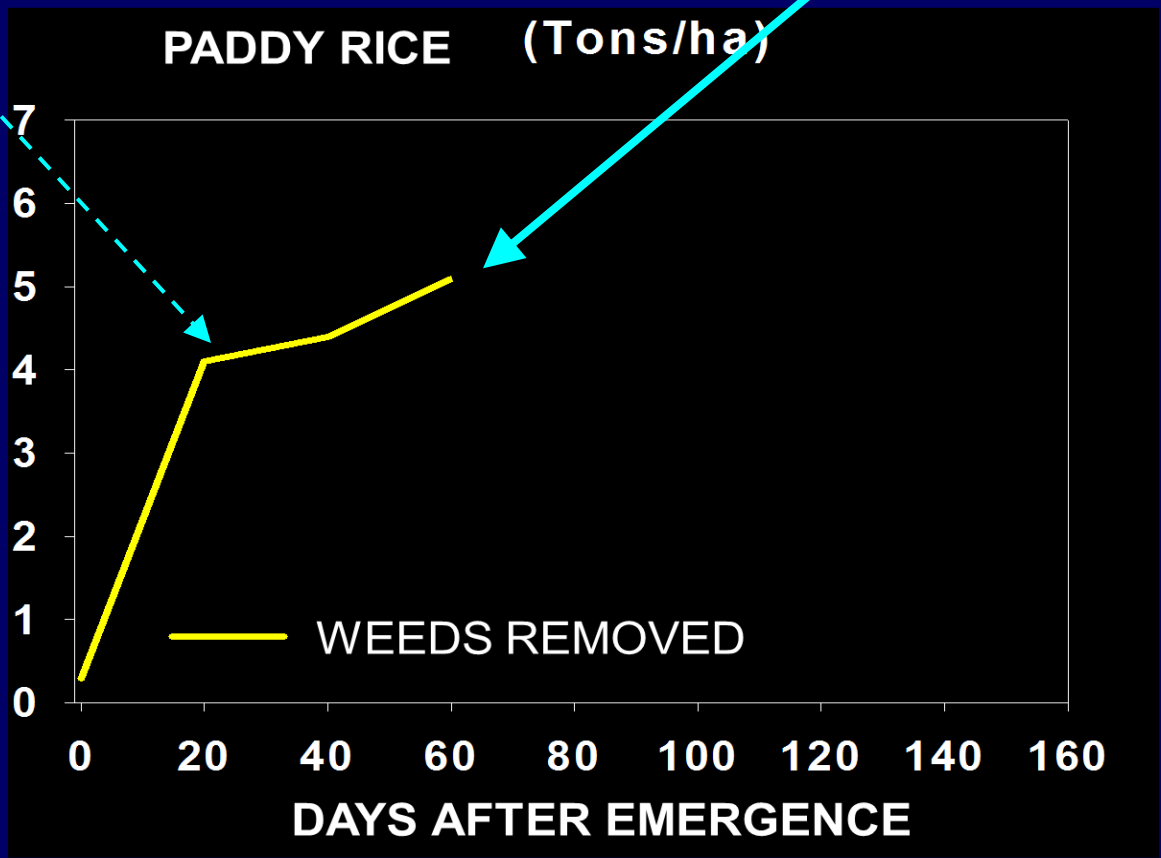
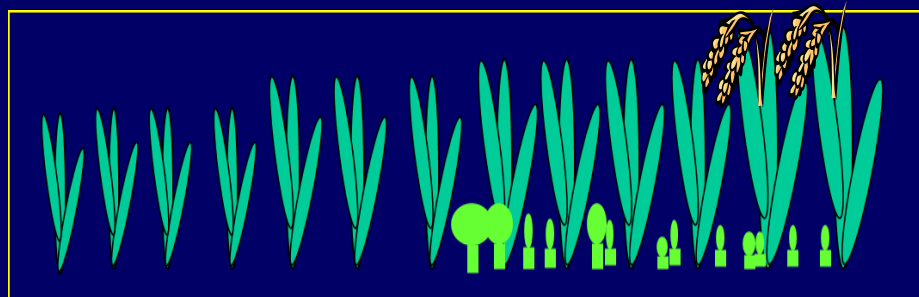
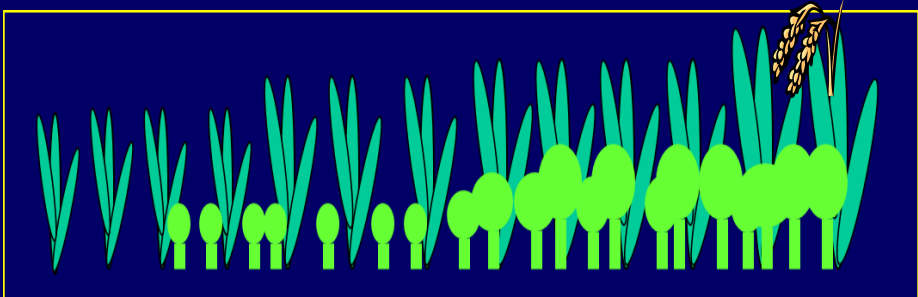
~~Critical period of Weed Control~~

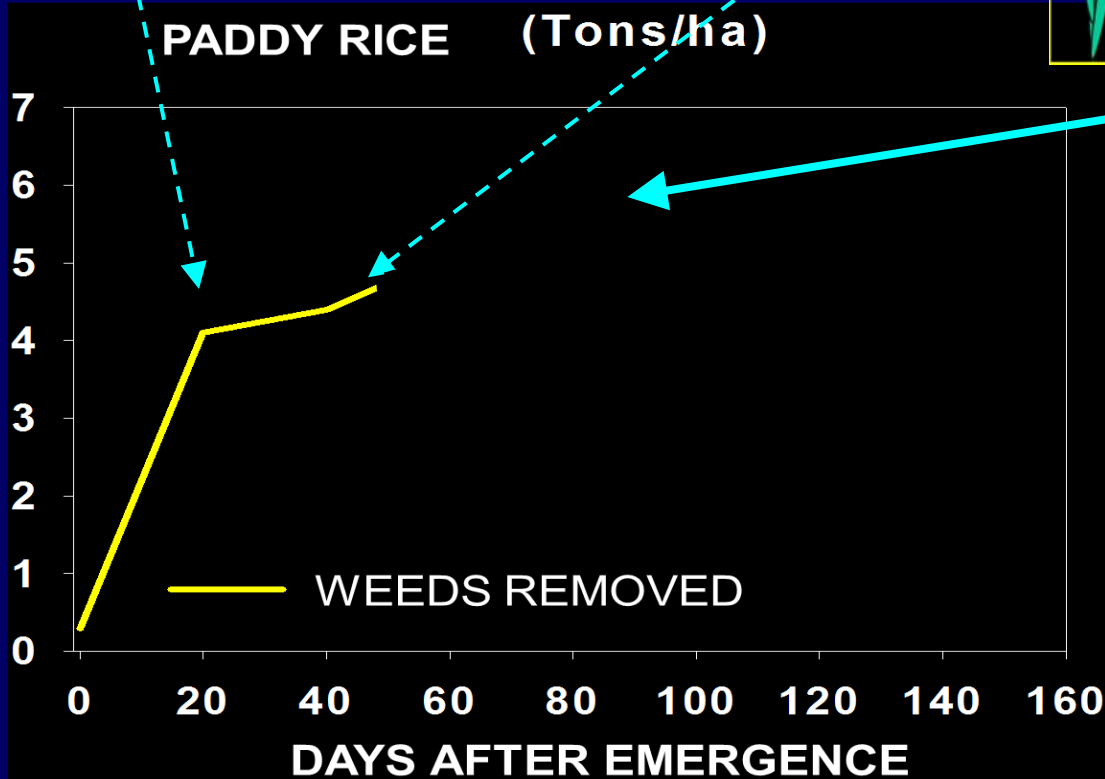
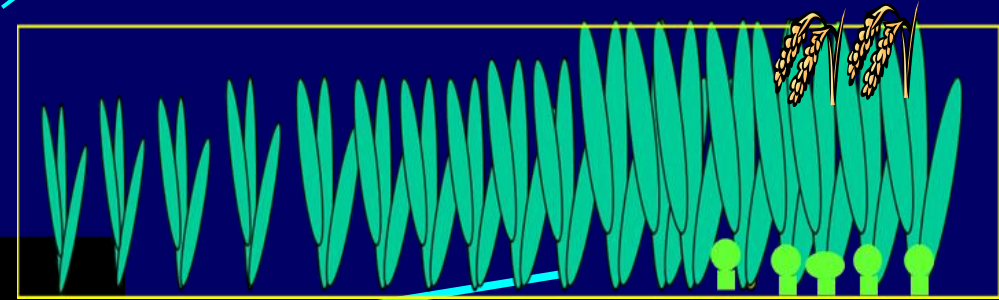
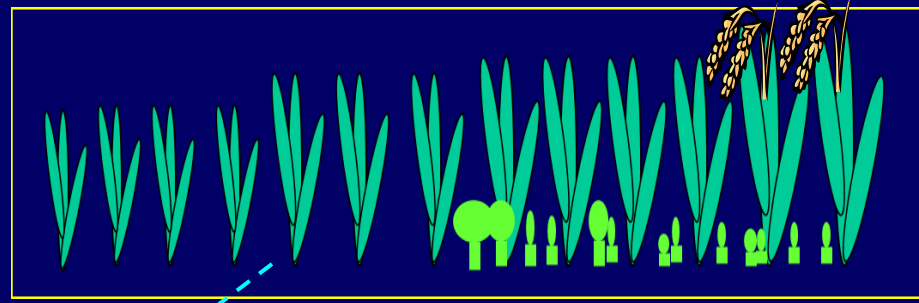
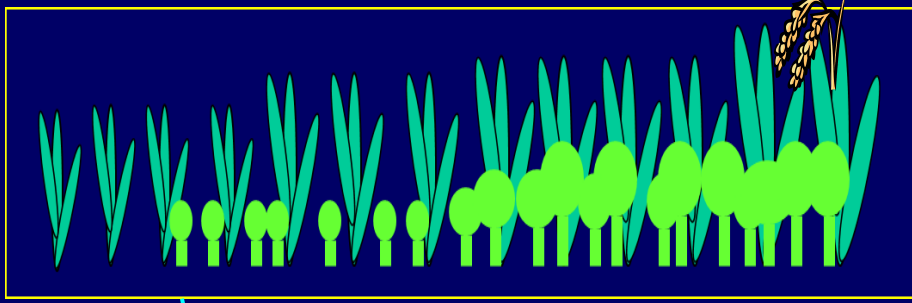
Even so, why do people often spray or control weeds late?

- They sprayed late the first time, weeds were too big and continued growing
- The weeds have become resistant to the herbicide and continued growing
- The crop was stressed or there was not a uniform crop stand to ensure full canopy closure
- **Lack of a continuous flood**

What happens if we drop the water ?







**Dropping the
water severely
compromises the
competitive ability
of rice**

~~Critical period of Weed Control~~

Even so, why do people often spray or control weeds late?

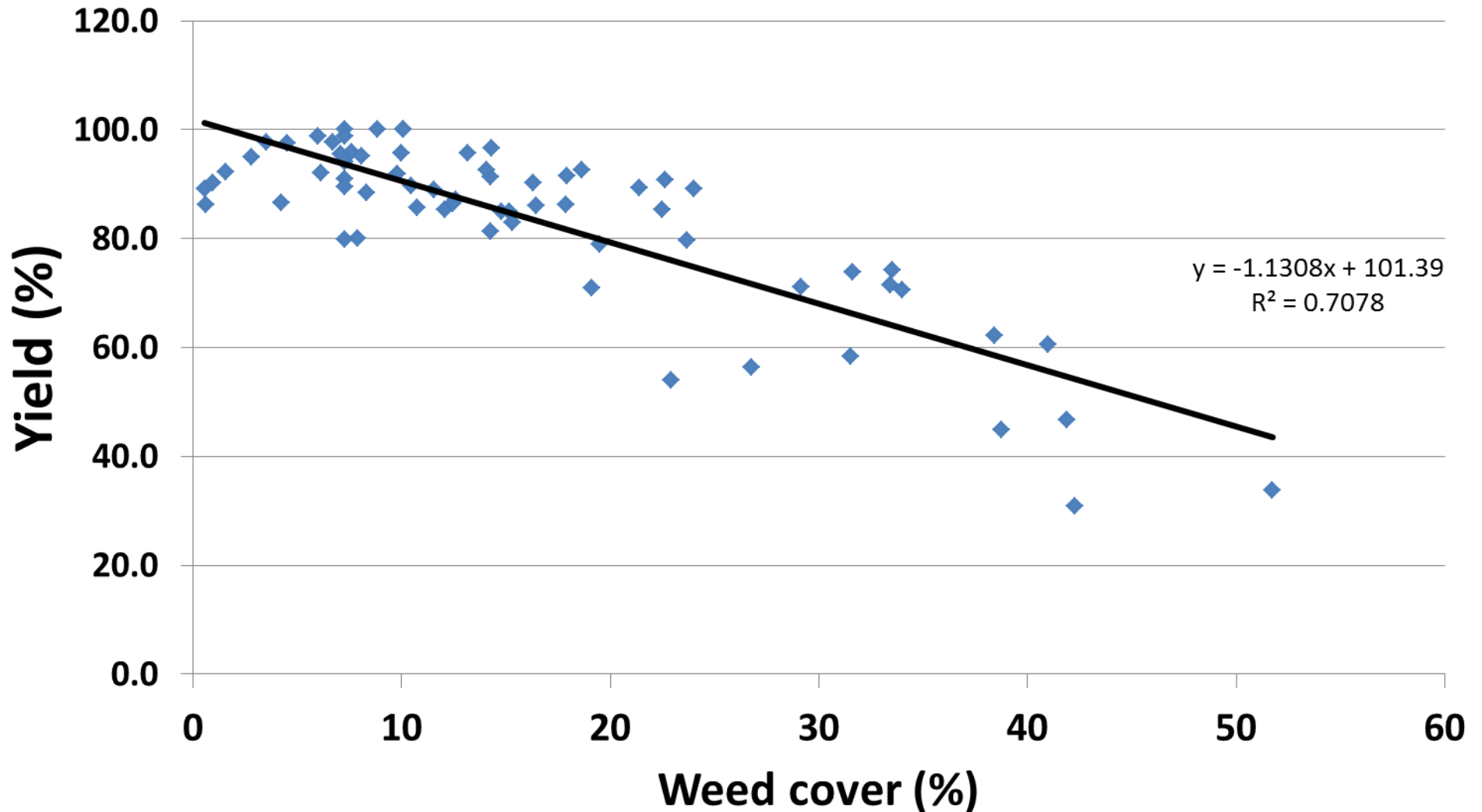
- They sprayed late the first time, weeds were too big and continued growing
- The weeds have become resistant to the herbicide and continued growing
- The crop was stressed or there was not a uniform crop stand to ensure full canopy closure
- There is not a continuous flood
- **If weeds are still present late in the season, they need to be eliminated to prevent seed shattering**

Competitive outcome is strongly determined by:

- **The Timing & Duration of Competition**
- **Level of infestation**

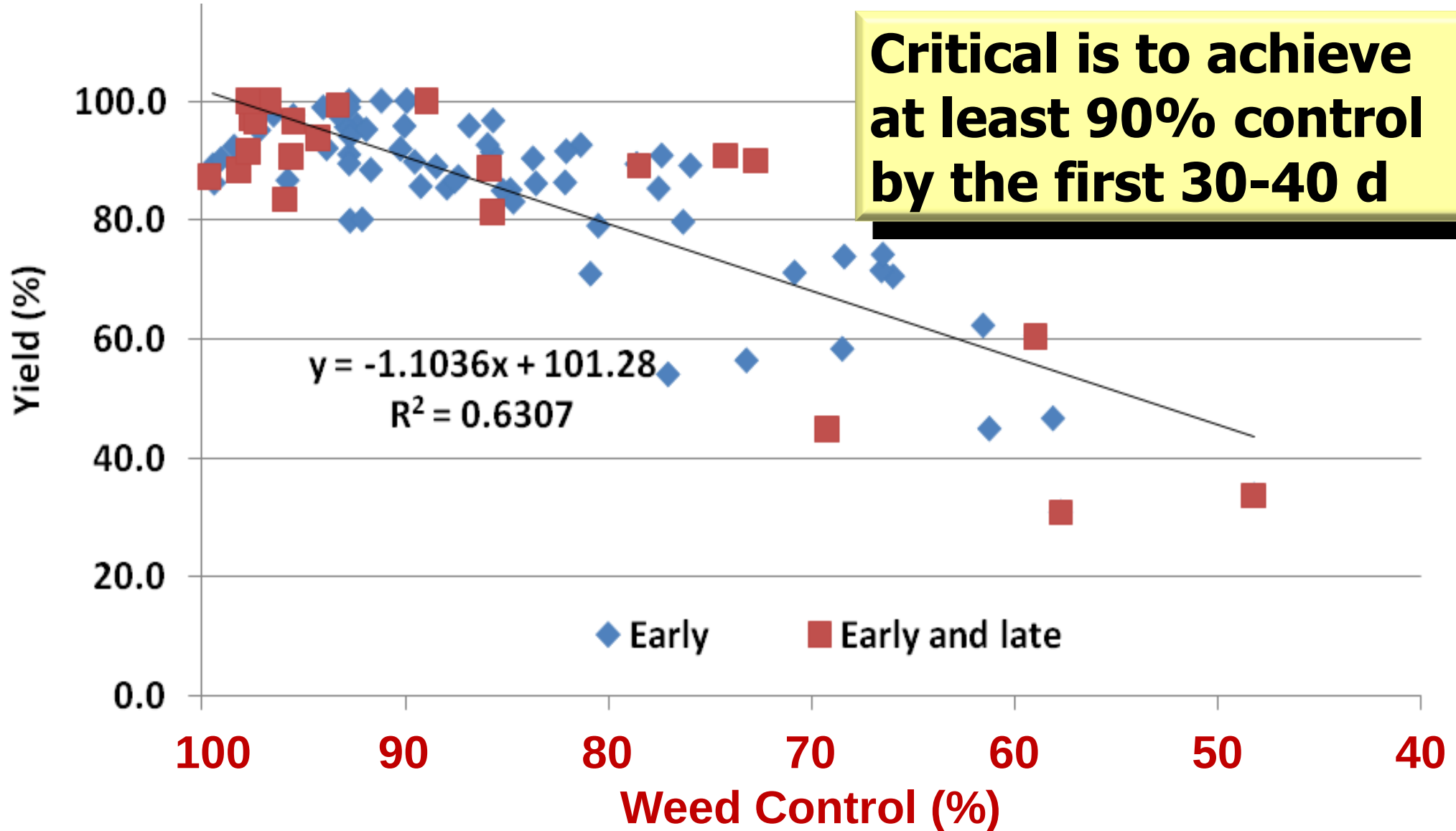
Weed competition in pin-point flooded rice

weed infestation by 40 days after seeding rice

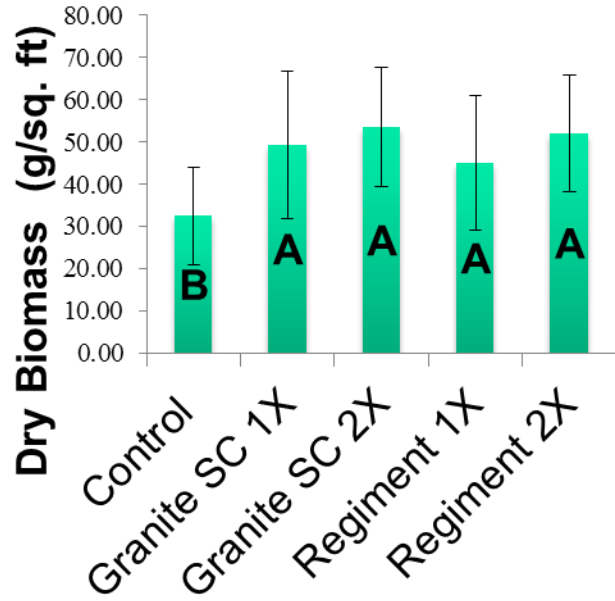


2007-2010 herbicide efficacy

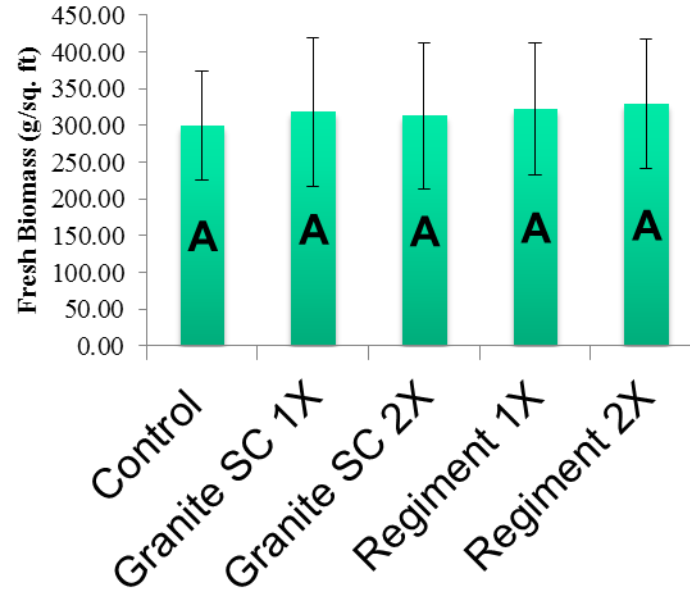
Weed Control (%) by 40 d after seeding



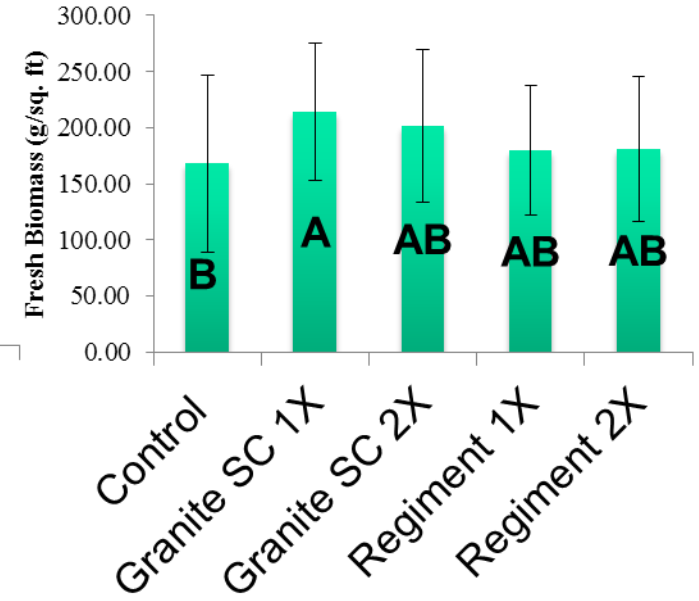
**2008 Pinpoint Herbicide
Dry Biomass**



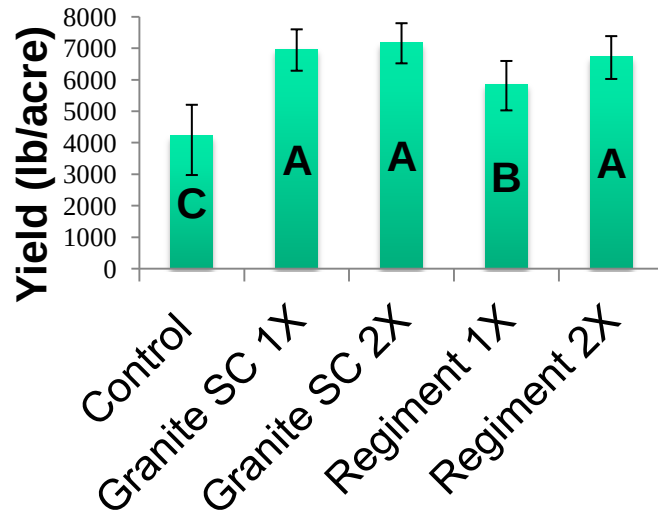
**2009 Pinpoint Herbicide
Fresh Biomass**



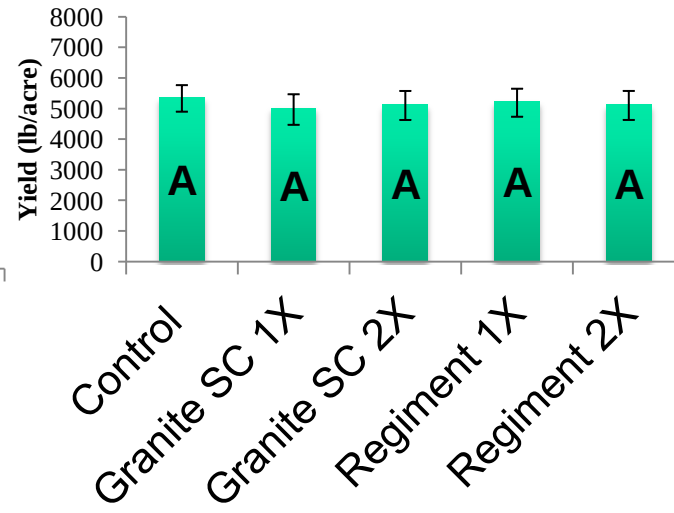
**2010 Pinpoint Herbicide
Fresh Biomass**



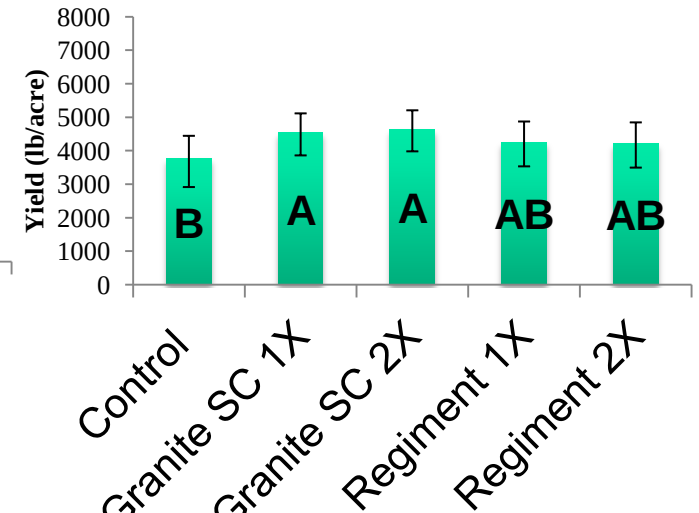
**2008 Pinpoint Herbicide
Yields**



**2009 Pinpoint Herbicide
Yields**

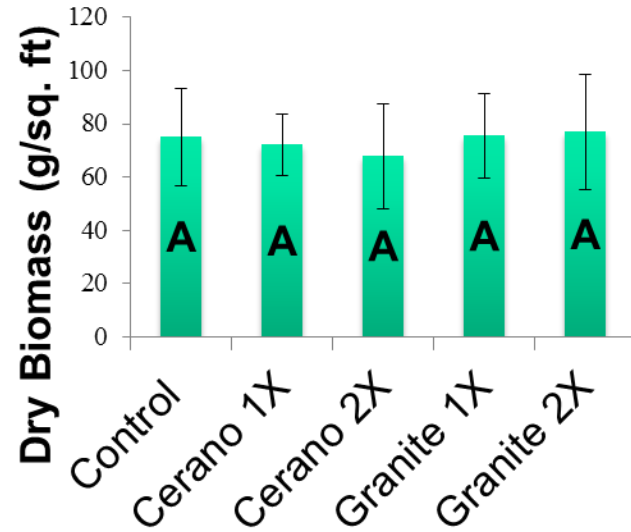


**2010 Pinpoint Herbicide
Yields**

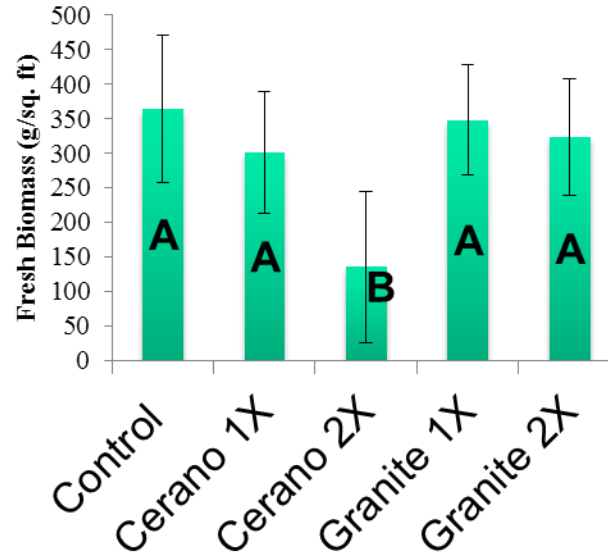


	Yield (% of Untreated)					
	2008		2009		2010	
Calmochi	168	C	102	A	109	B
L206	169	C	92	AB	224	A
M202	128	D	82	B	107	B
M205	231	A	101	A	120	B
M206	202	B	96	AB	124	B
S102	137	D	97	A	122	B

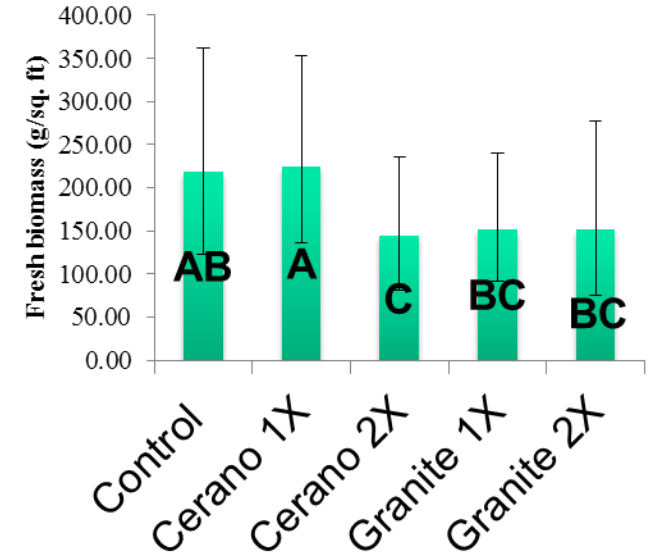
2008 Flood Herbicide Dry Biomass



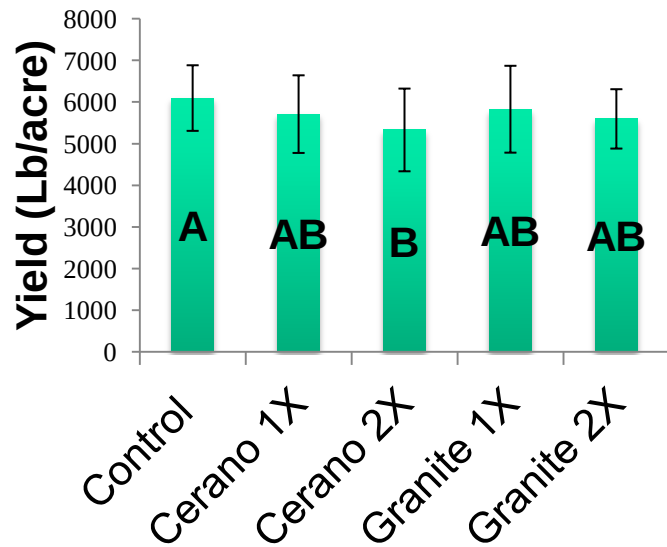
2009 Flood Herbicide Fresh Biomass



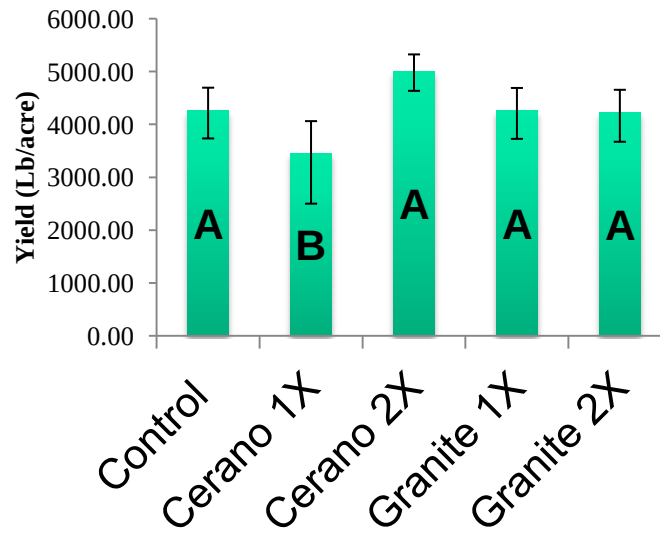
2010 Flood Herbicide Fresh Biomass



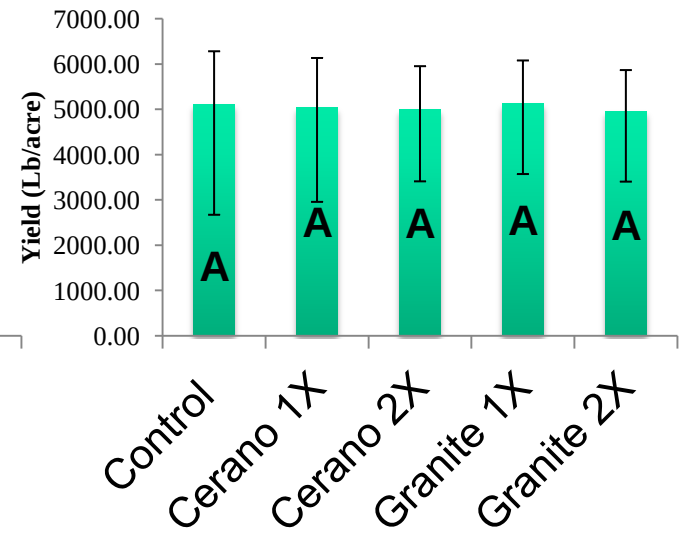
2008 Flood Herbicide Yields



2009 Flood Herbicide Yields



2010 Flood Herbicide Yields



Flooded Rice

	Yield (% of Untreated)					
	2008		2009		2010	
Calmochi	89	A	91	A	94	A
L-206	100	A	95	A	96	A
M-202	89	A	98	A	101	A
M-205	96	A	98	A	113	A
M-206	90	A	99	A	98	A
S-102	90	A	85	A	94	A