

Time of Weed Emergence and Economic Impact on Crops

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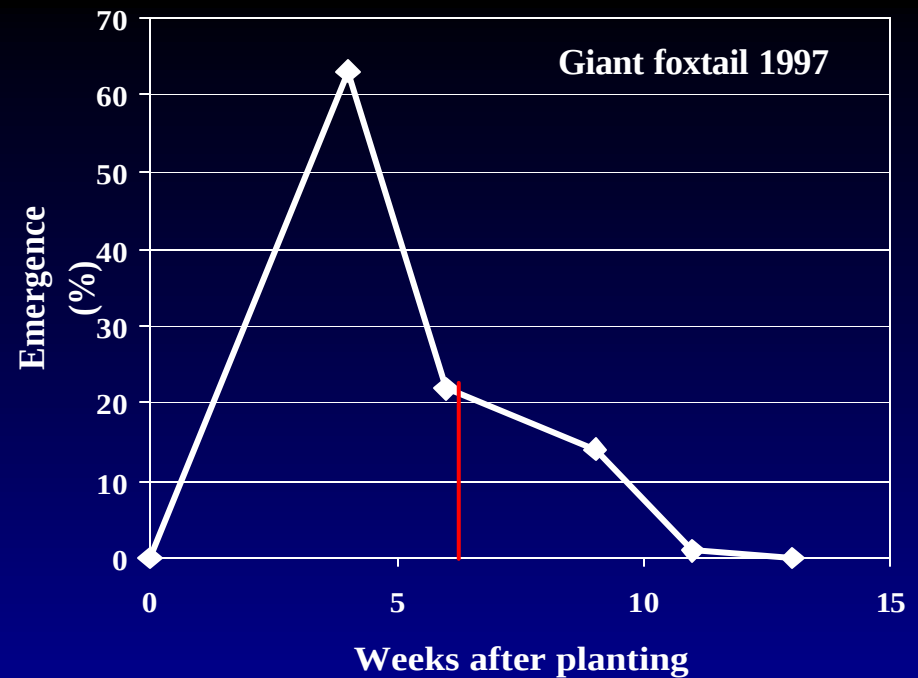
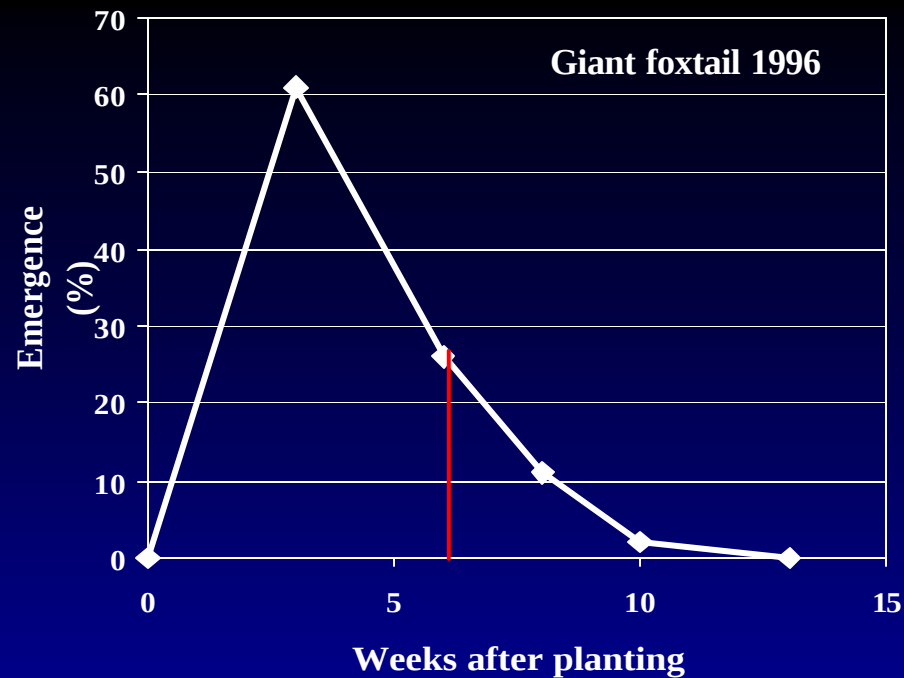
Factors to Understand

- Weed Biology

- Emergence
- Natural mortality
- Growth
- Competition
- Seed production



- Economic Simulations



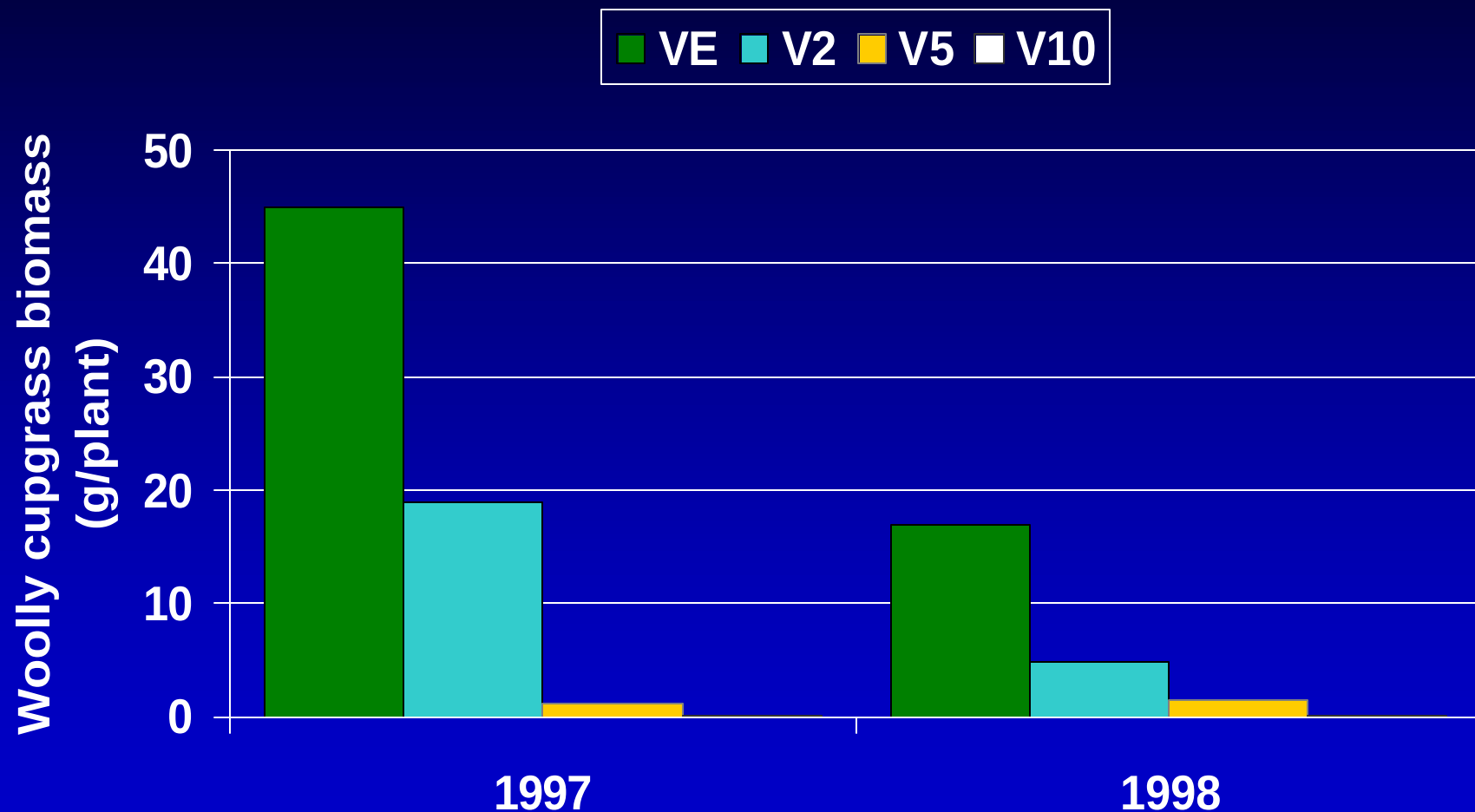
**80% of foxtail and lambquarters
emerged by 6 weeks after planting**

Weed Survival and Mortality

	<u>Corn</u>	<u>Soybeans</u>
Giant foxtail mortality:	42 - 56%	40 - 58%
Velvetleaf mortality:		
without verticillium	44%	38%
with verticillium	58%	92%

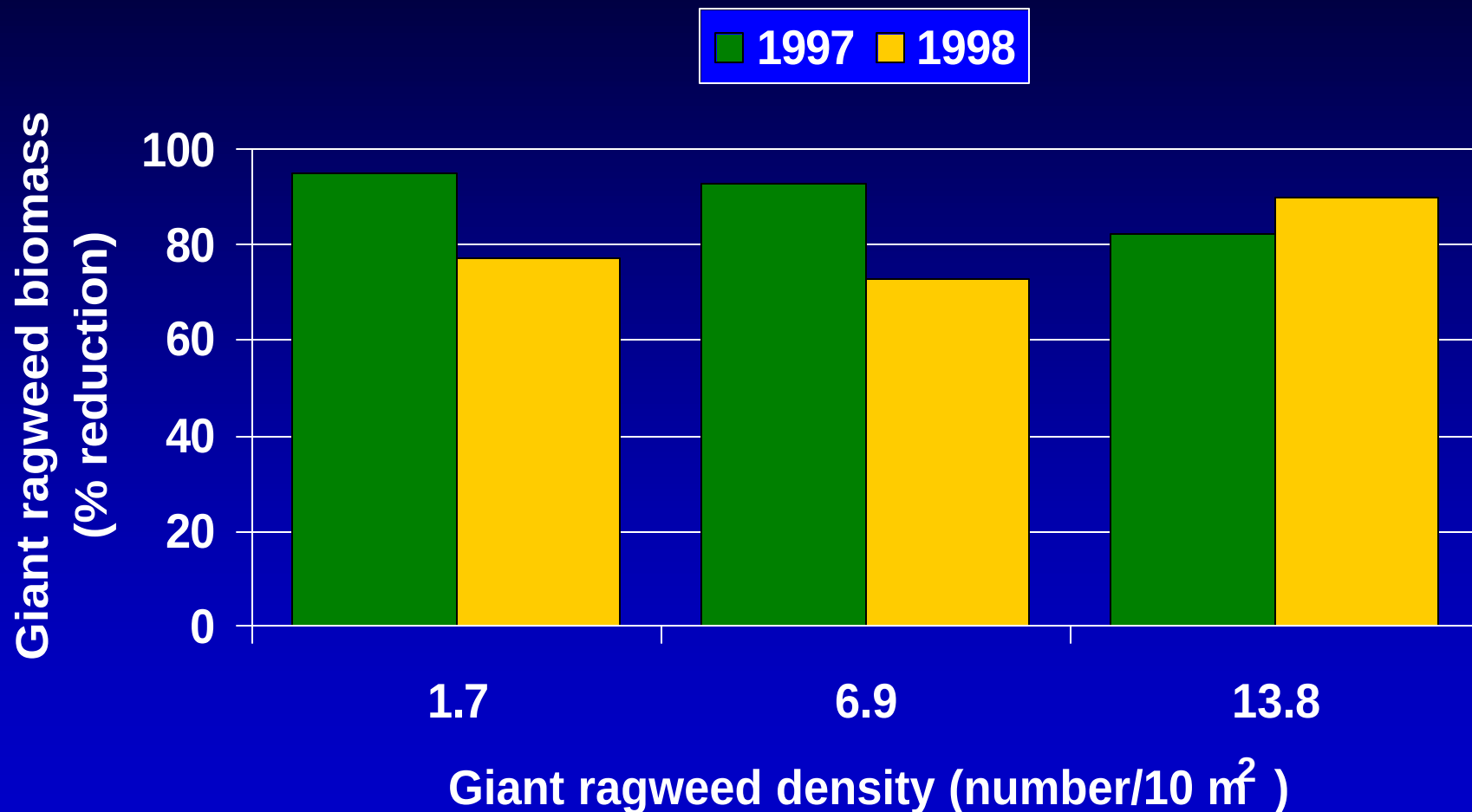
Natural mortality helps but is not enough

Woolly cupgrass growth when emerging at different corn growth stages

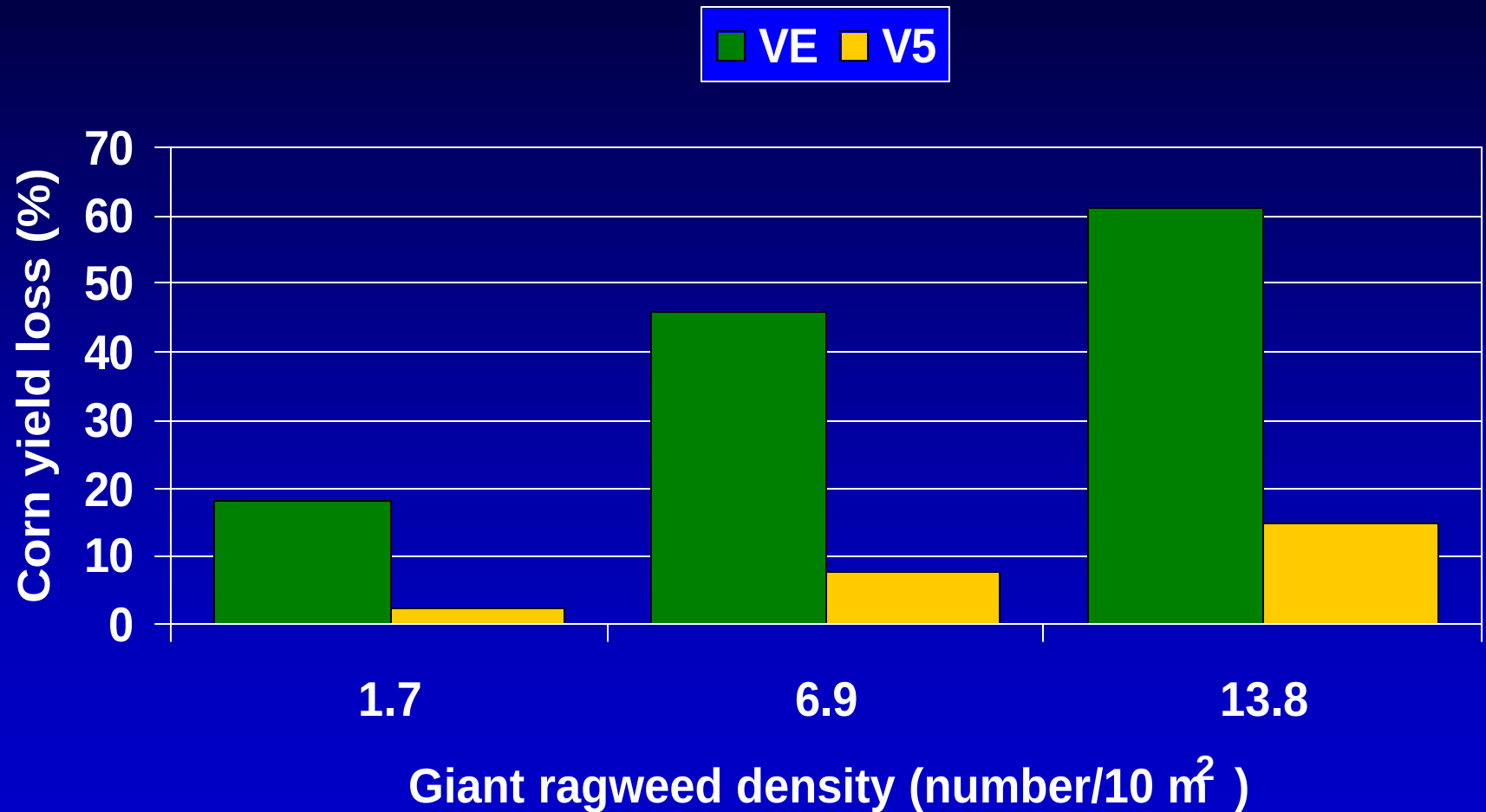


Mickelson and Harvey 1999

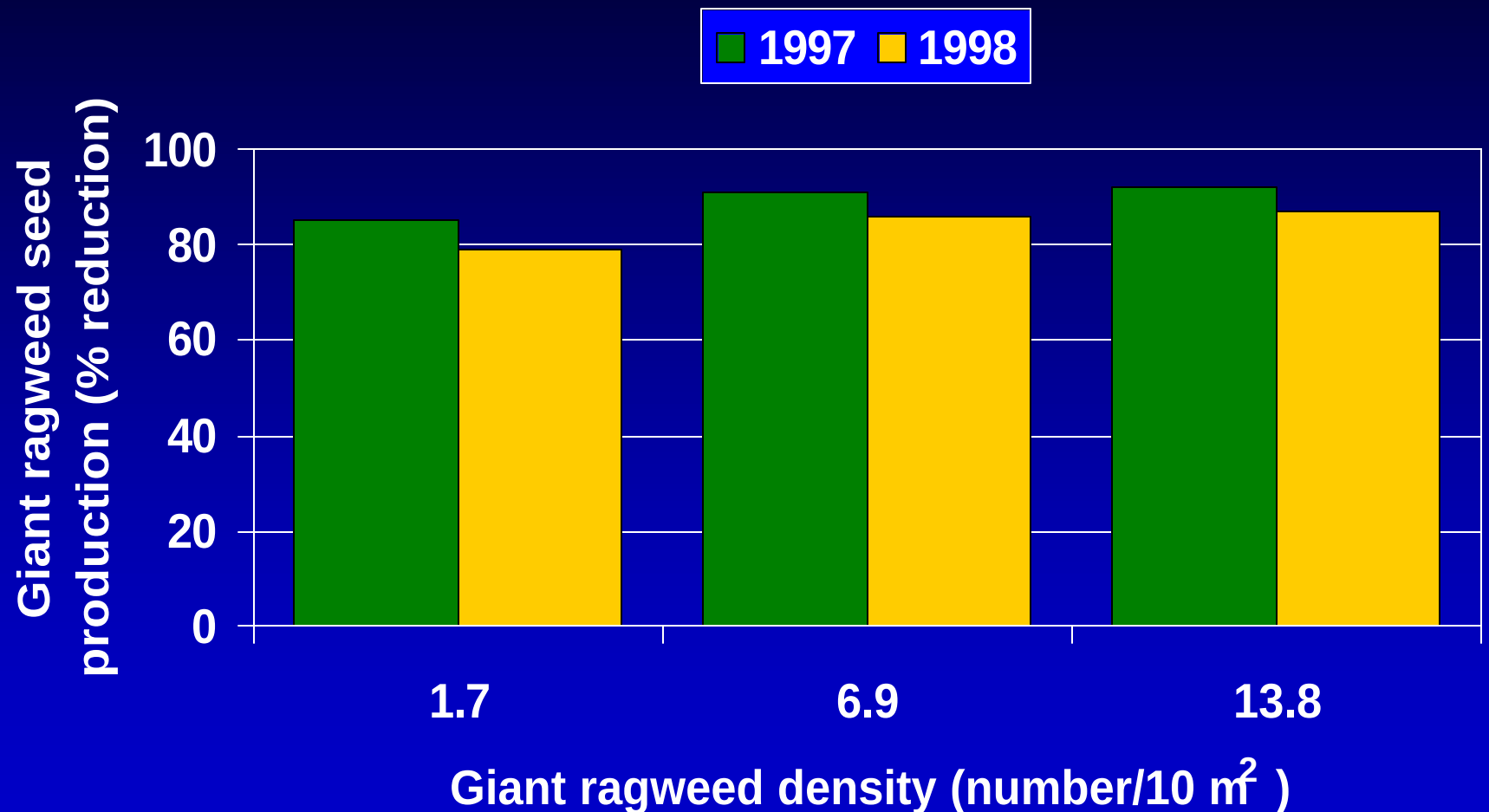
Reduction in giant ragweed growth when emerging 4 weeks after corn planting



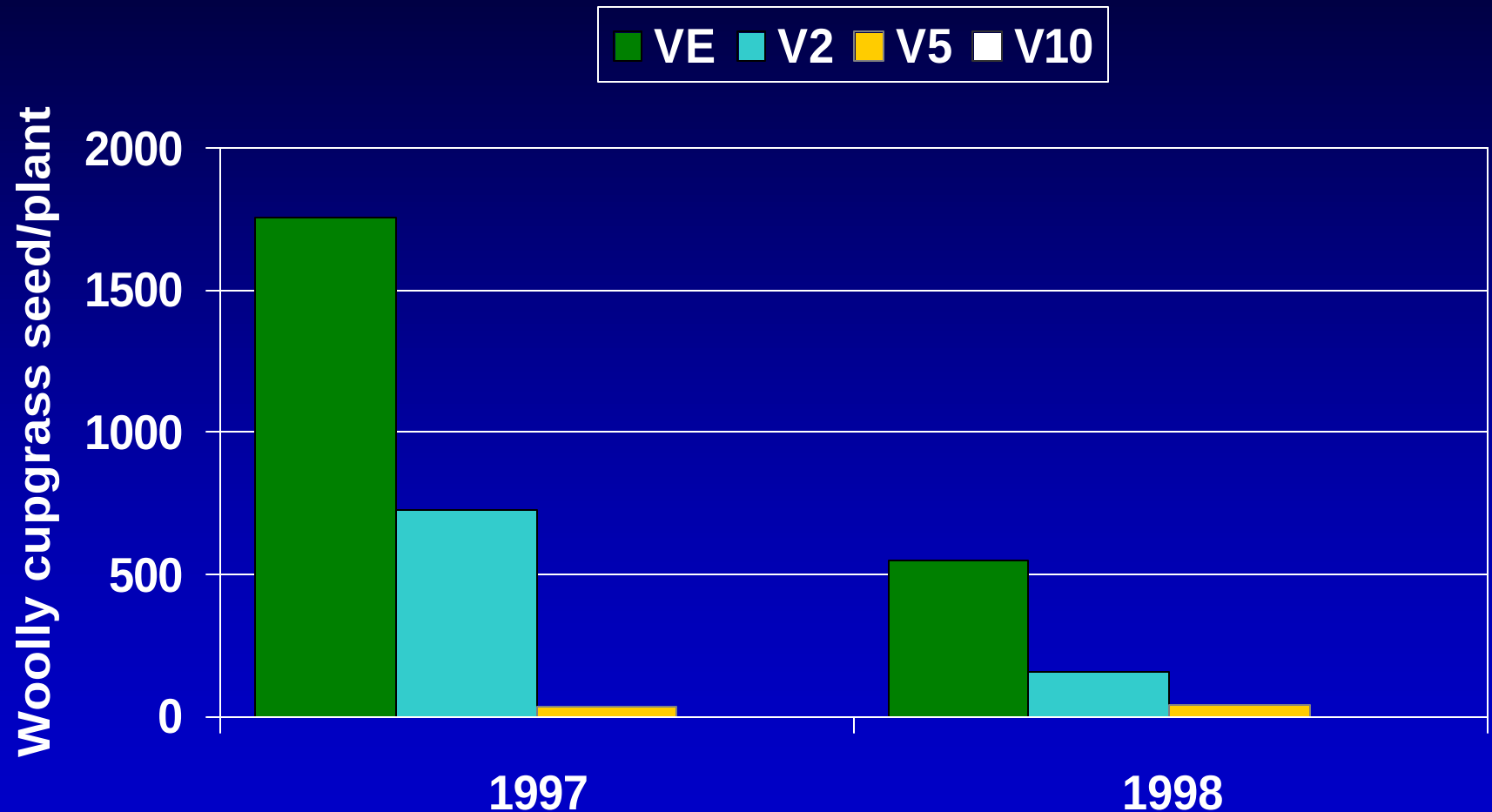
Corn yield loss from giant ragweed emerging with and 4 weeks after corn planting



Reduction in giant ragweed seed production when emerging 4 weeks after corn planting



Woolly cupgrass seed production when emerging at different corn growth stages



Mickelson and Harvey 1999

- Major percentage of weeds emerge early in the season
 - while preemergence herbicides have residual activity or
 - prior to postemergence herbicide applications
- Natural mortality will further reduce weed survival
- Late emerging weeds have greatly reduced
 - growth
 - competition against crops
 - seed production
- Still, late emerging weeds are a concern
 - especially when crop canopies are not vigorous

What are the economic impacts of late emerging weeds?

- Keys factors
 - Weed species
 - Weed density
 - Time of emergence or size
- WeedSOFT simulations
 - Predict estimated yield loss
 - Provide calculation of return to herbicide treatment

Estimated corn yield loss and returns to Accent based on giant foxtail competition

Corn size	<u>Giant foxtail</u>		Yield loss	Return to Accent
	Size	Density		
(inch)	(inch)	(no/100 ft ²)	(%)	(\$/a)
0-5	2-4	100	22	54.23
6-12	2-4	100	16	29.73
12-24	2-4	100	8.5	3.23
> 24	2-4	100	3.9	-18.52

Estimated corn yield loss and returns to NorthStar based on giant ragweed competition

Corn size (inch)	<u>Giant ragweed</u>		Yield loss (%)	Return to NorthStar (\$/a)
	Size (inch)	Density (no/100 ft ²)		
0-5	2-4	30	25	74.14
6-12	2-4	30	18	48.14
12-24	2-4	30	9.9	18.64
> 24	2-4	30	4.7	-0.49

Considerations toward management

1. Focus on excellent control of early emerging weeds
 - most competitive and produce most seed
2. Common weeds that emerge later (> 6 weeks after planting) have minimal effect on yield and control may be hard to economically justify
 - may have few herbicide options or risk injury
 - control of highly competitive weeds may be justified
3. Crop competition greatly reduces seed production of late emerging weeds
 - reduction may be 90% or greater
 - seed production should not be a concern at lower weed densities
4. Threshold for treatment may need to be lowered if conditions cause poor canopy growth