Impact of Weed Control Practices on Weed Communities in Vineyards

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Changes in the Weed Populations over five years

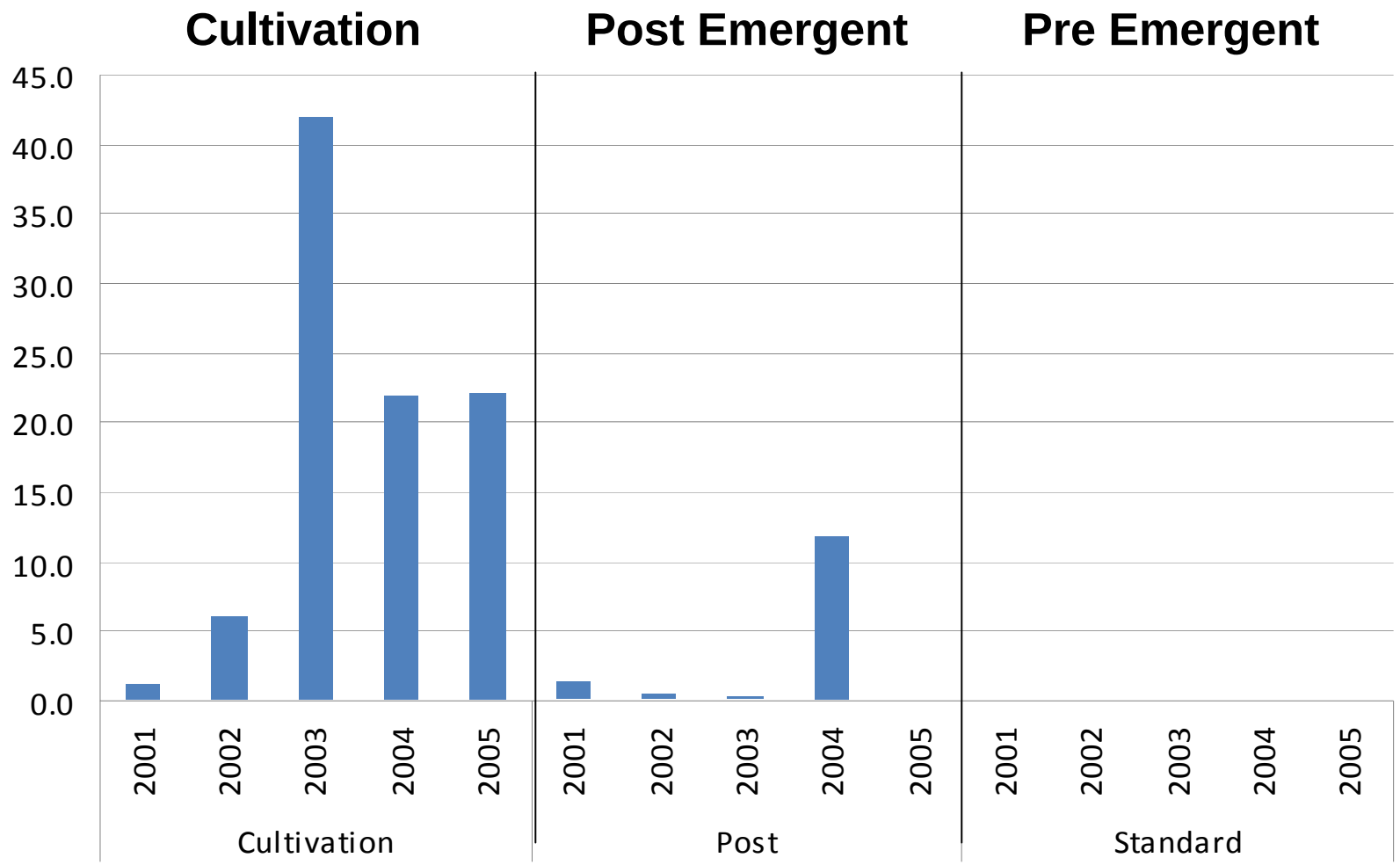
- The trial was initiated in the 7th year of an established vineyard
- The weed control program prior to the initiation of the trial was a combination of cultivation and postemergence applications of Roundup + Goal
- This weed control program provided excellent suppression of the weeds in the vineyard and we assume that all plots had similar weed populations at the start of the trial

Weed Control Treatments On Vine Row Berms

- **Preemergence (Standard):**
  - Simazine + Goal preemergence in winter
  - Followed by post emergent applications of Roundup + Goal in summer
- **Cultivation:**
  - Cultivator used as needed (i.e. 1/month in summer)
  - Hand hoeing used as needed around trunks
- **Post emergent:**
  - Roundup + Goal (+Rely) in spring and summer

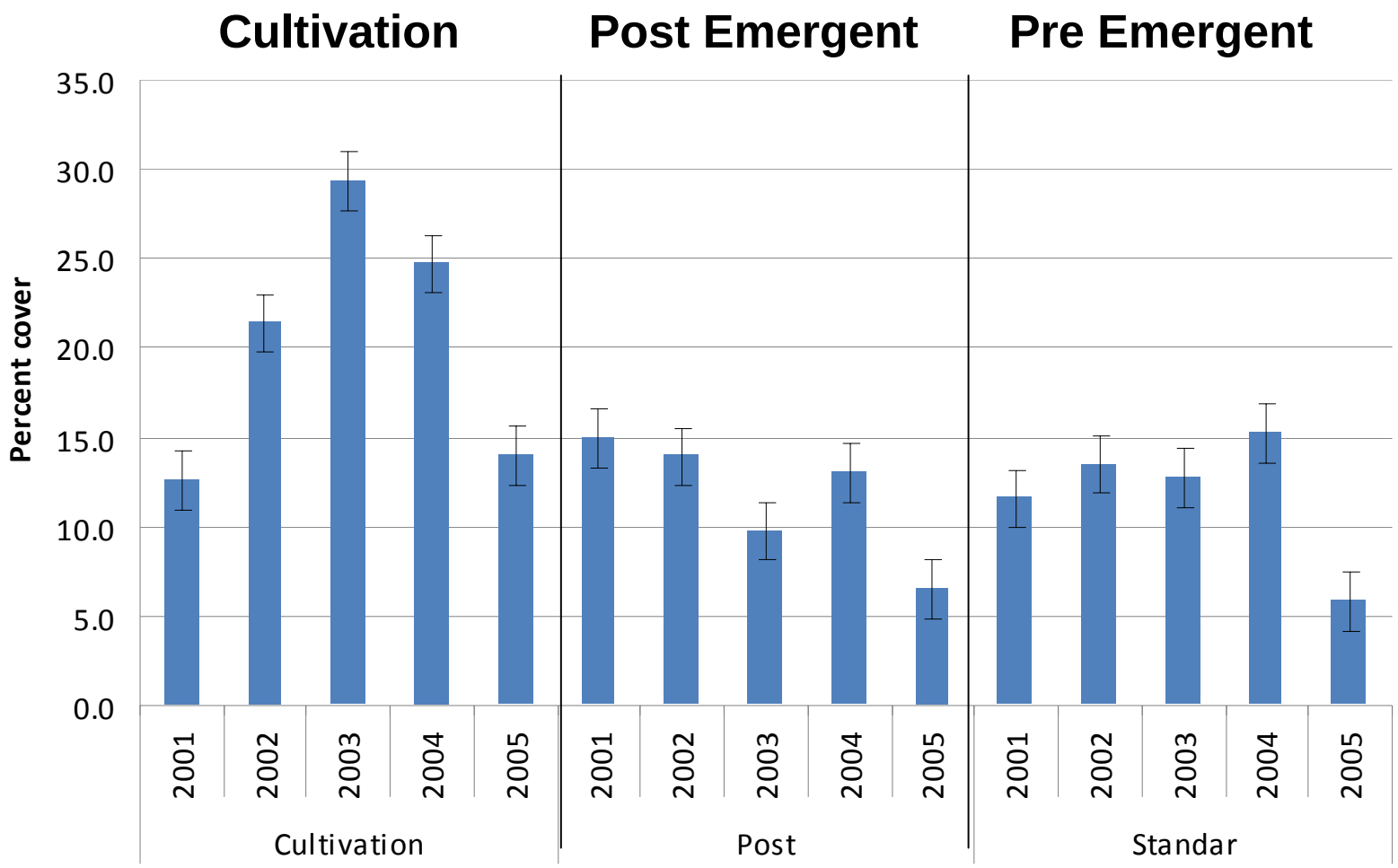
Winter/Spring Weeds

Five Year Trend



Summer/Fall Weeds

Five Year Trend

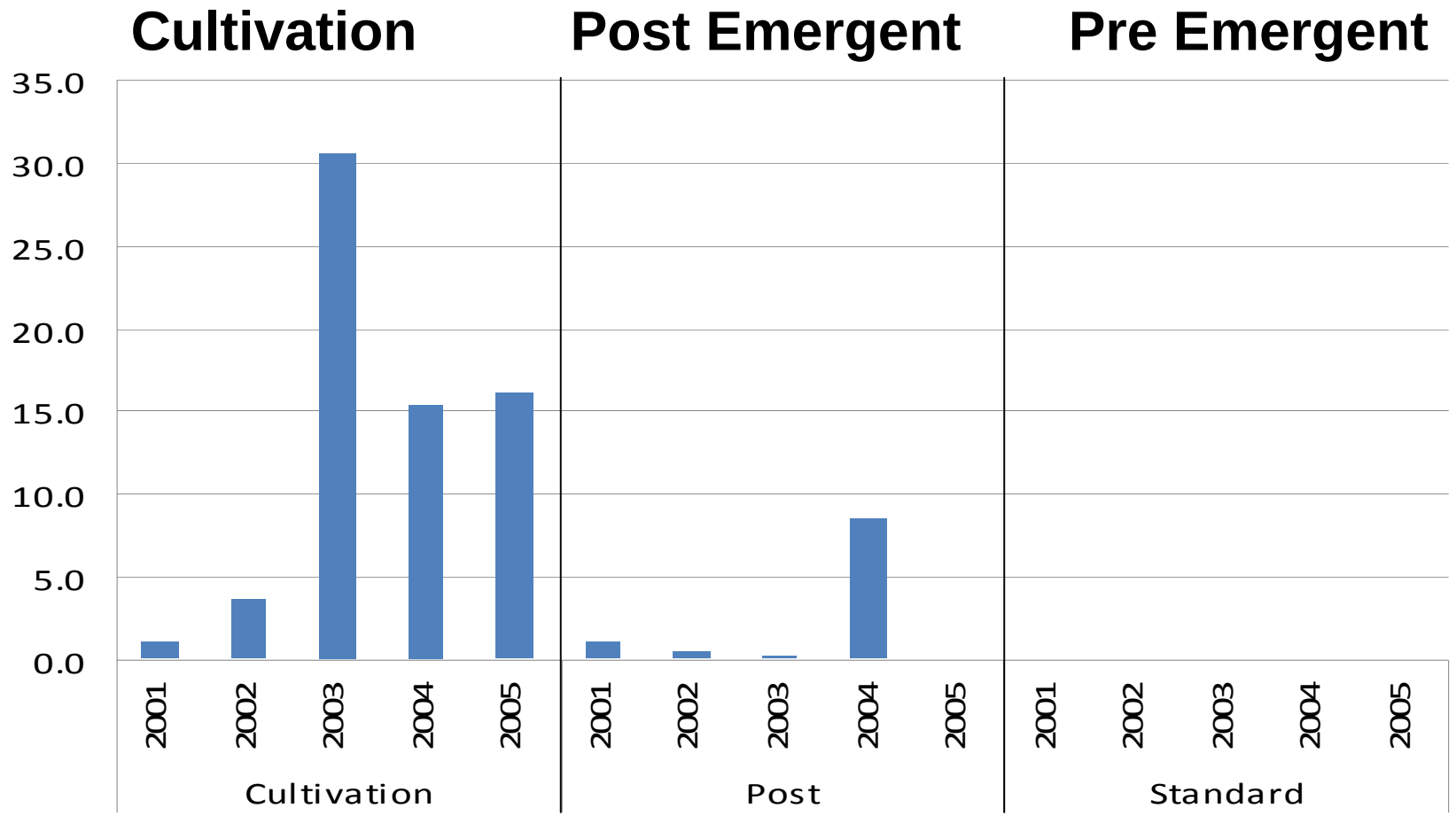


Cultivation Treatment

Clemens Cultivator

Shepherd's Purse
Key Winter weed

Shepherd's Purse Populations in the Weed Control Treatments Over Five



Common Purslane

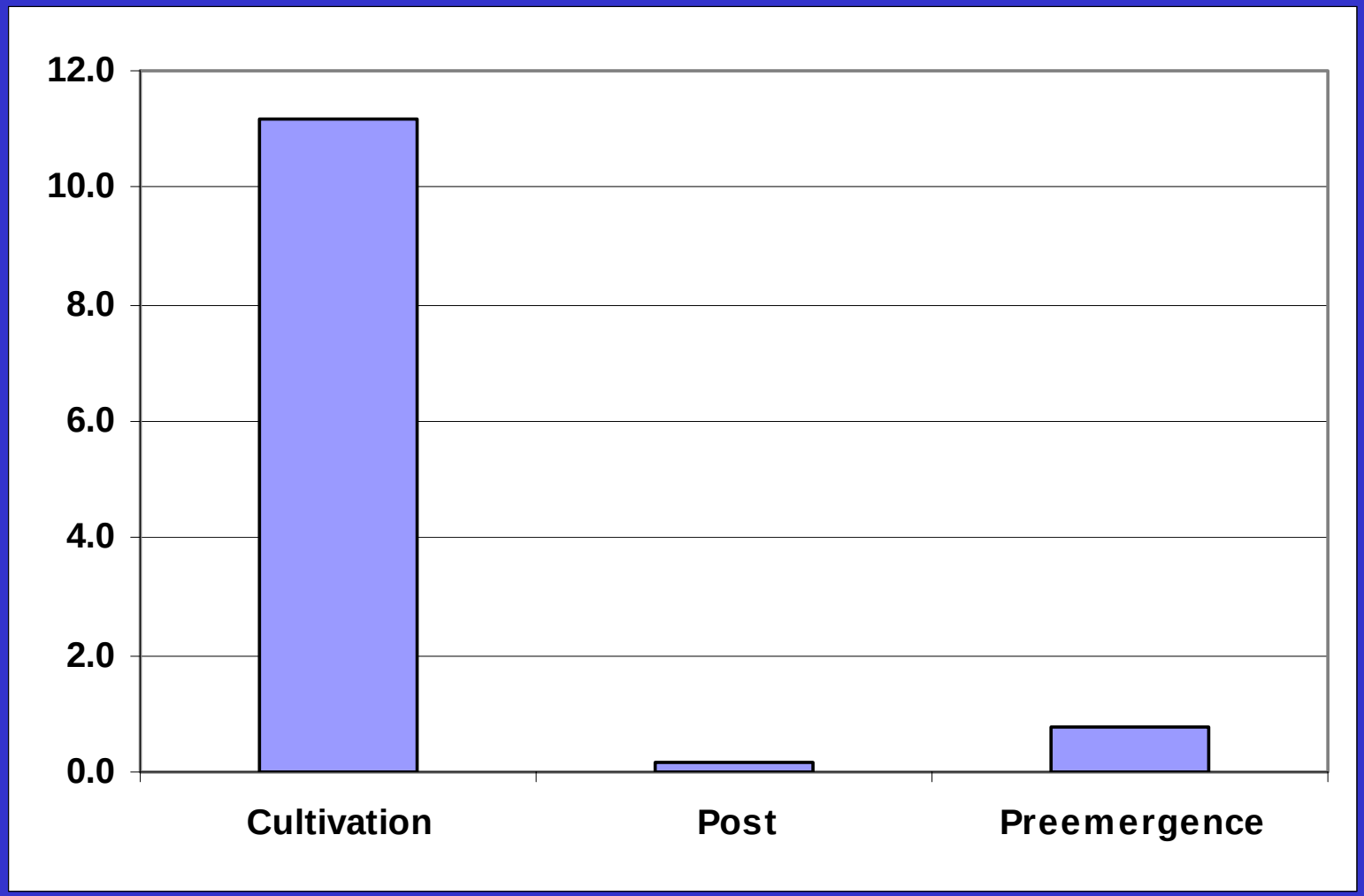
Summer weed

Purslane Biology

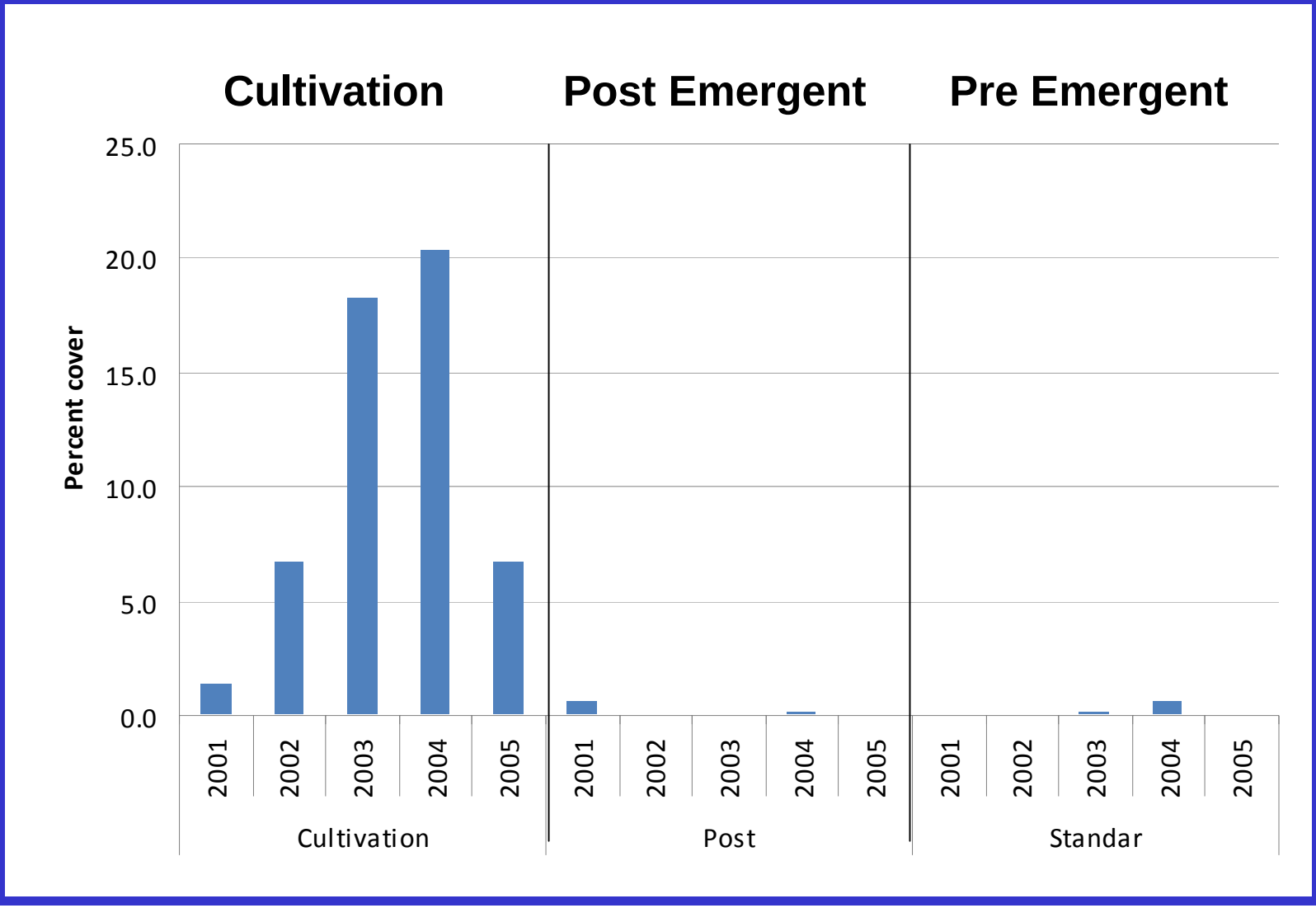
- Purslane is capable of rapid growth and absorbs and stores water
- It stores water in specialized cells that are covered with a thick cuticle
- It is capable of setting seed after being uprooted due to this high water content
- This is a strategy for survival and invasion

Percent Cover of Purslane

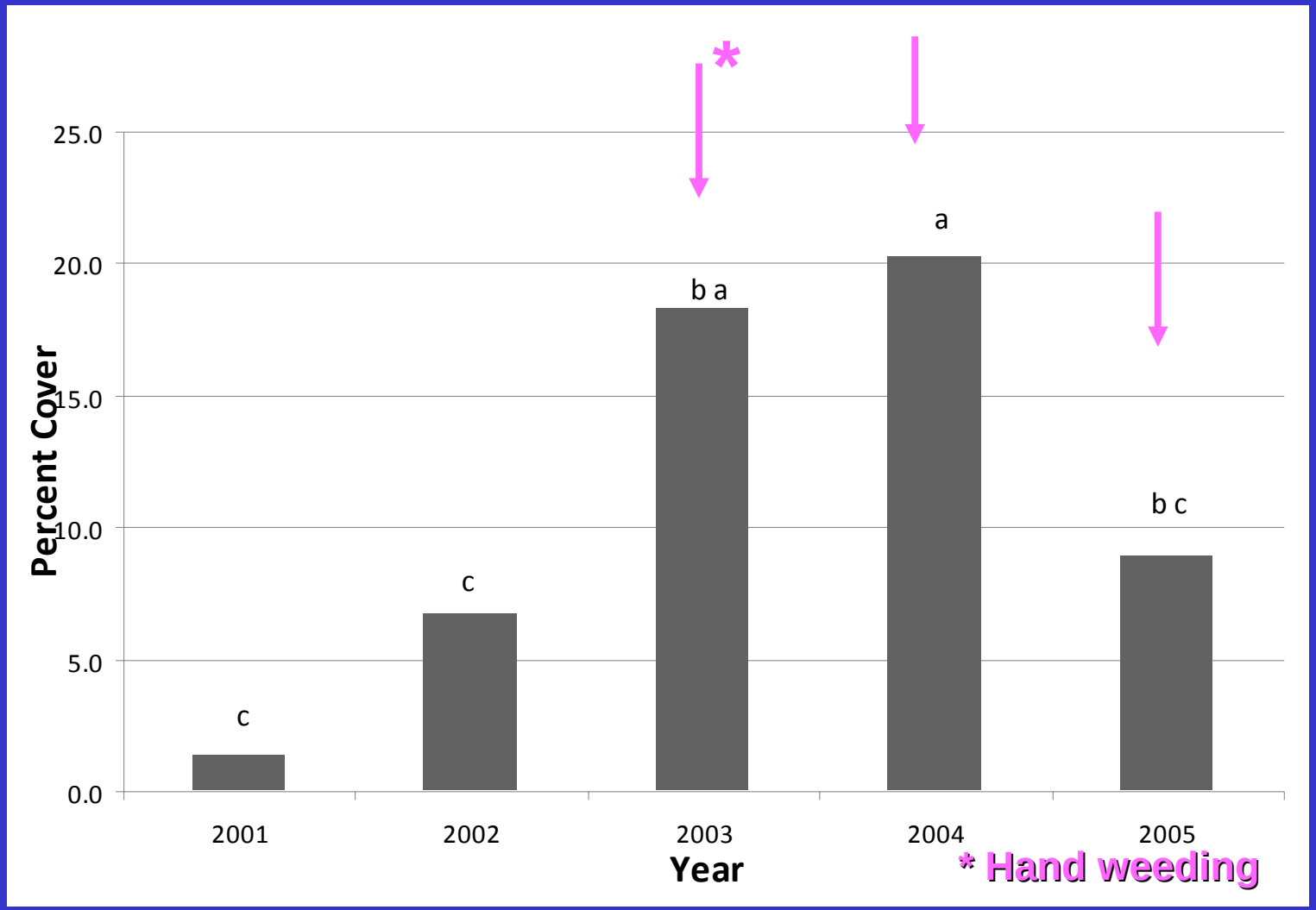
Five Year Mean

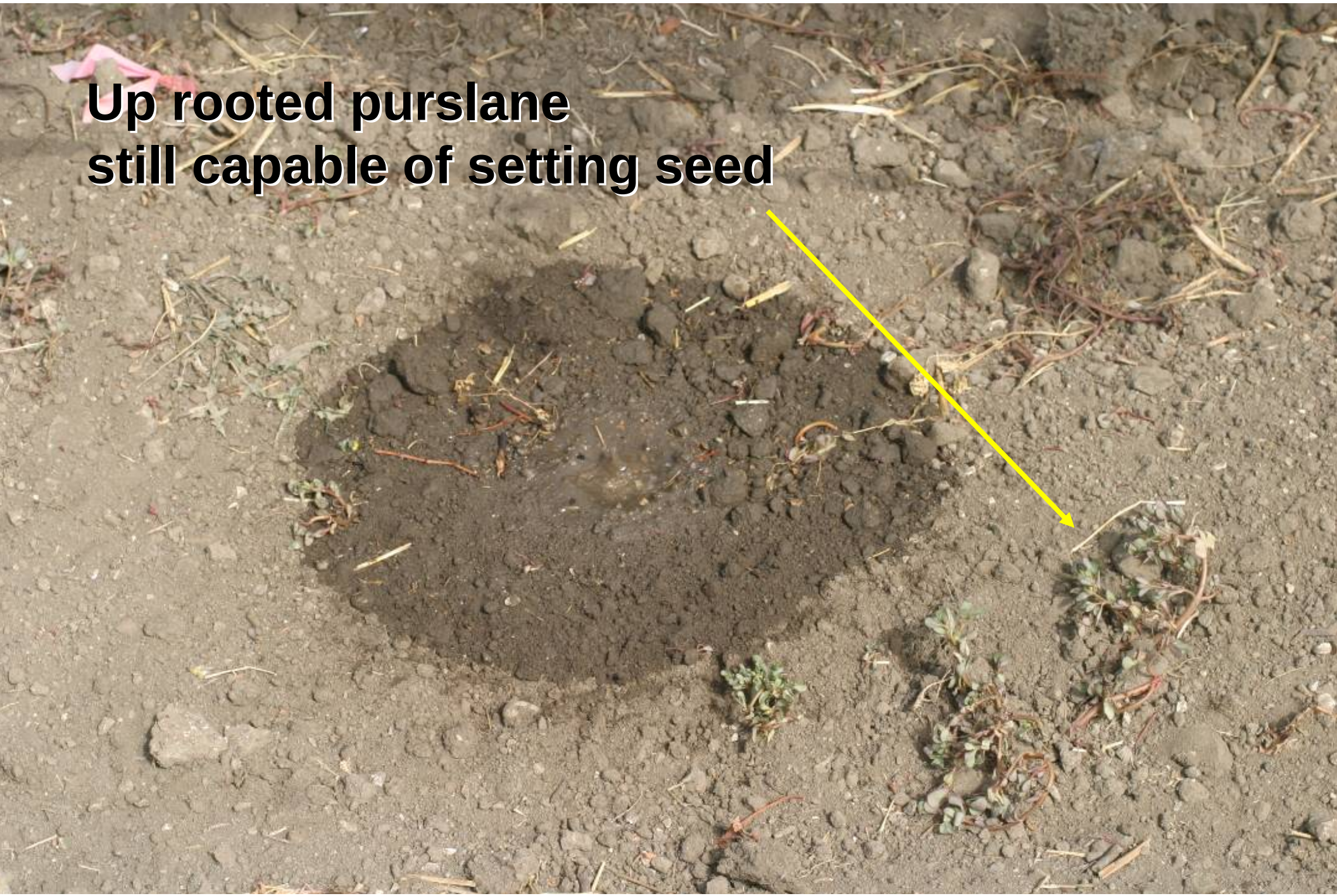


Purslane Population in Weed Control Treatments Over Five Years

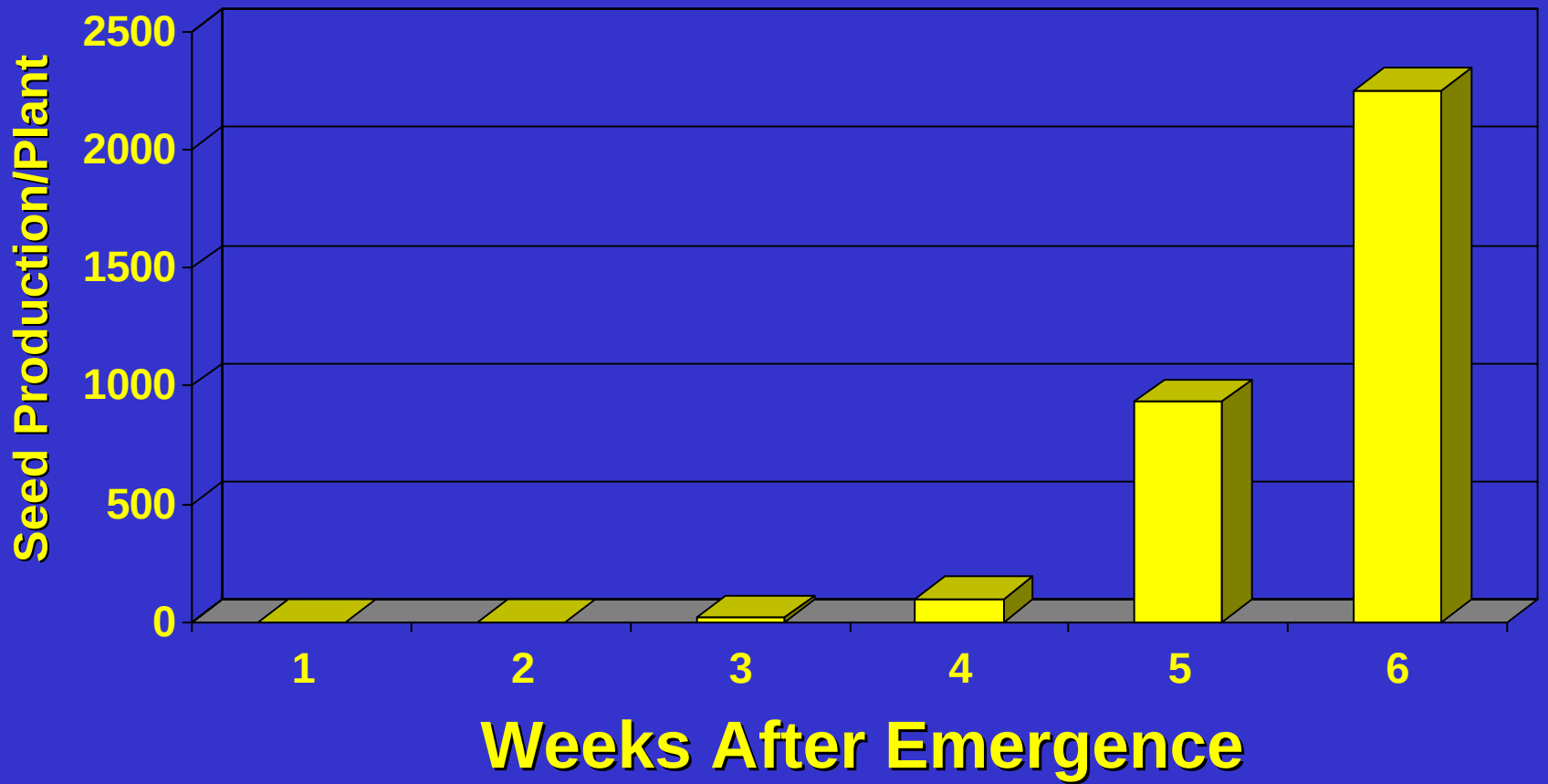


Purslane Population in the Cultivation Treatment over Five Years



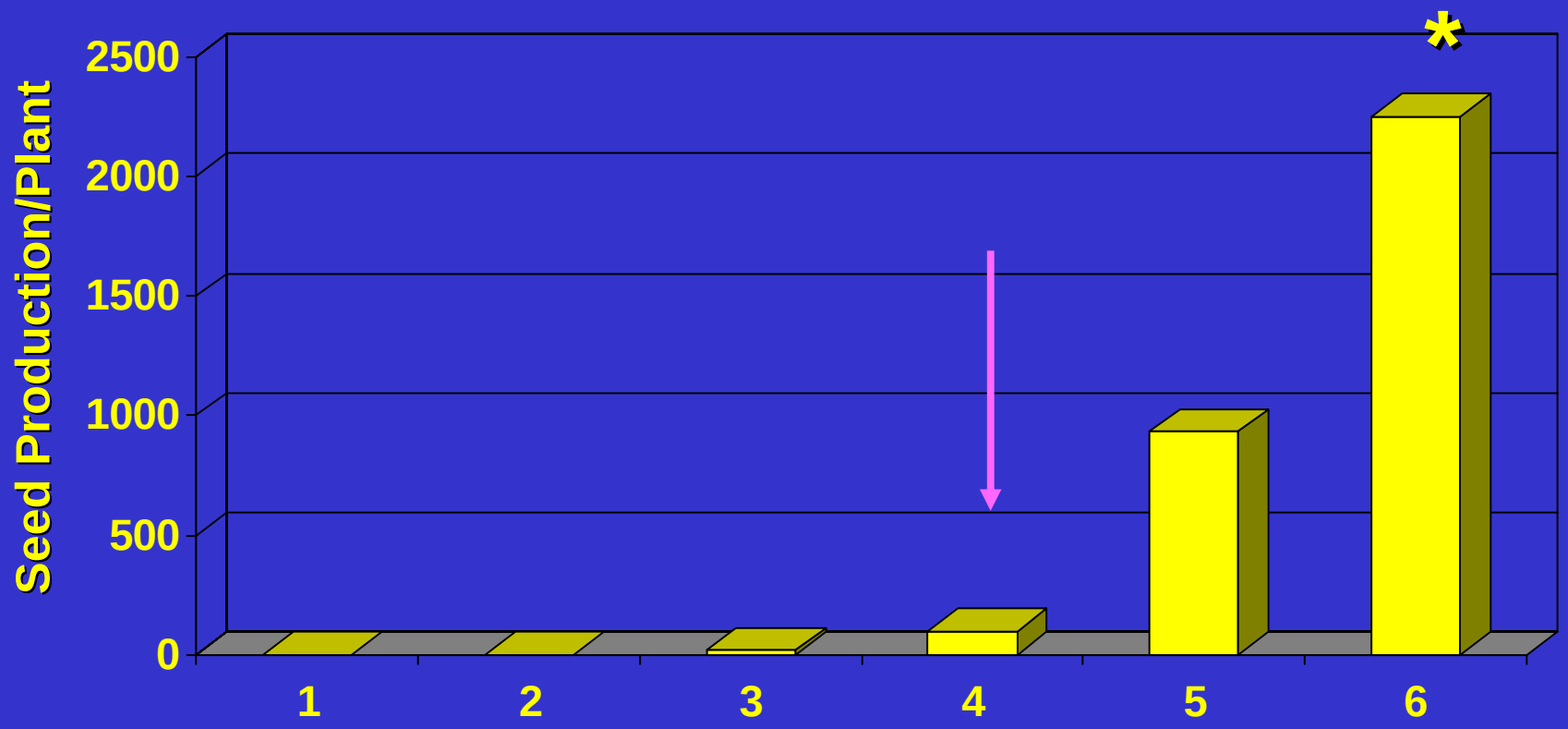

Up rooted purslane
still capable of setting seed

Seed Set by Uprooted Purslane Plants



Haar and Fennimore, 2003

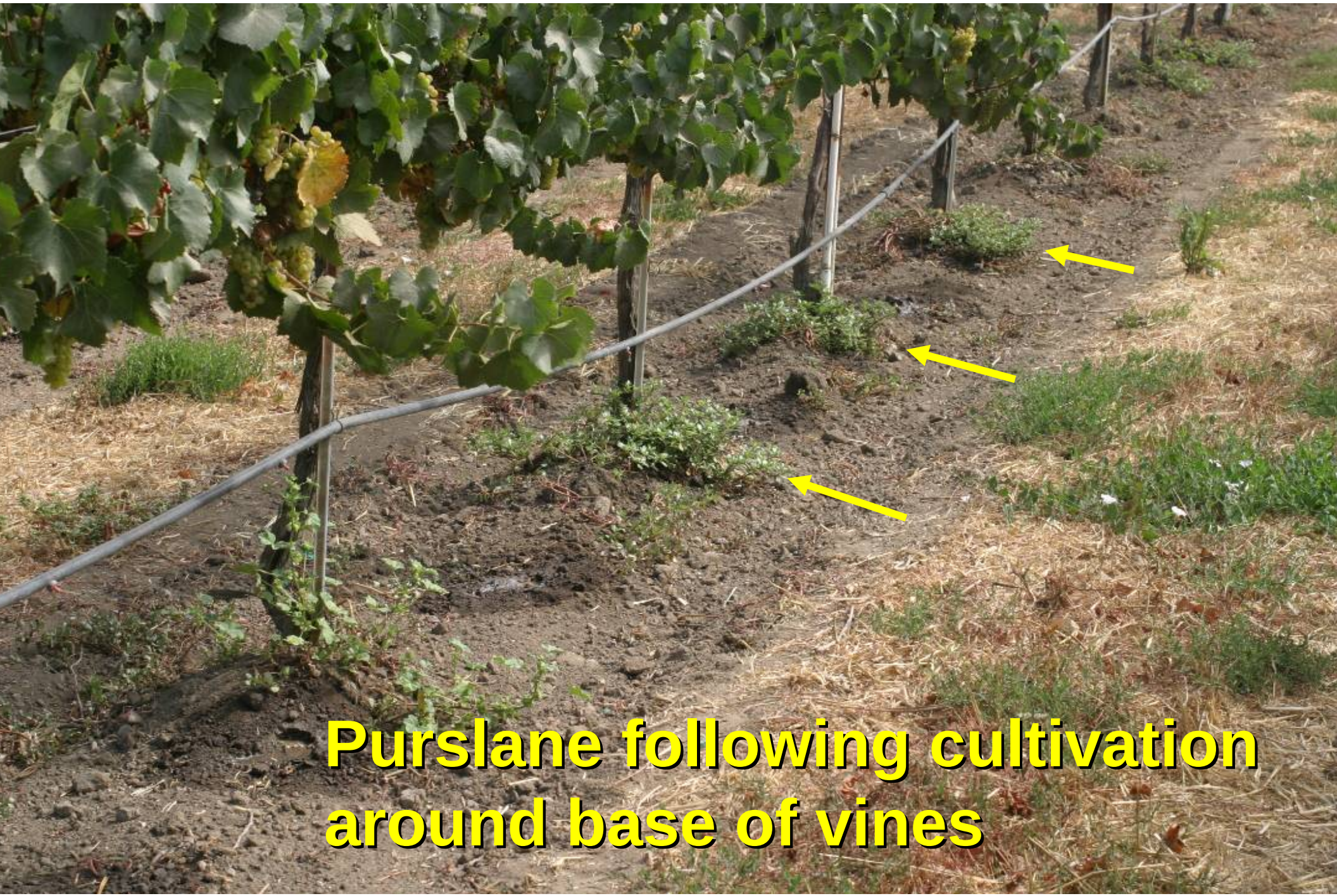
Seed Set by Uprooted Purslane Plants



* Mature plants can produce 240,000 seed

Haar and Fennimore, 2003


Purslane around base of vines

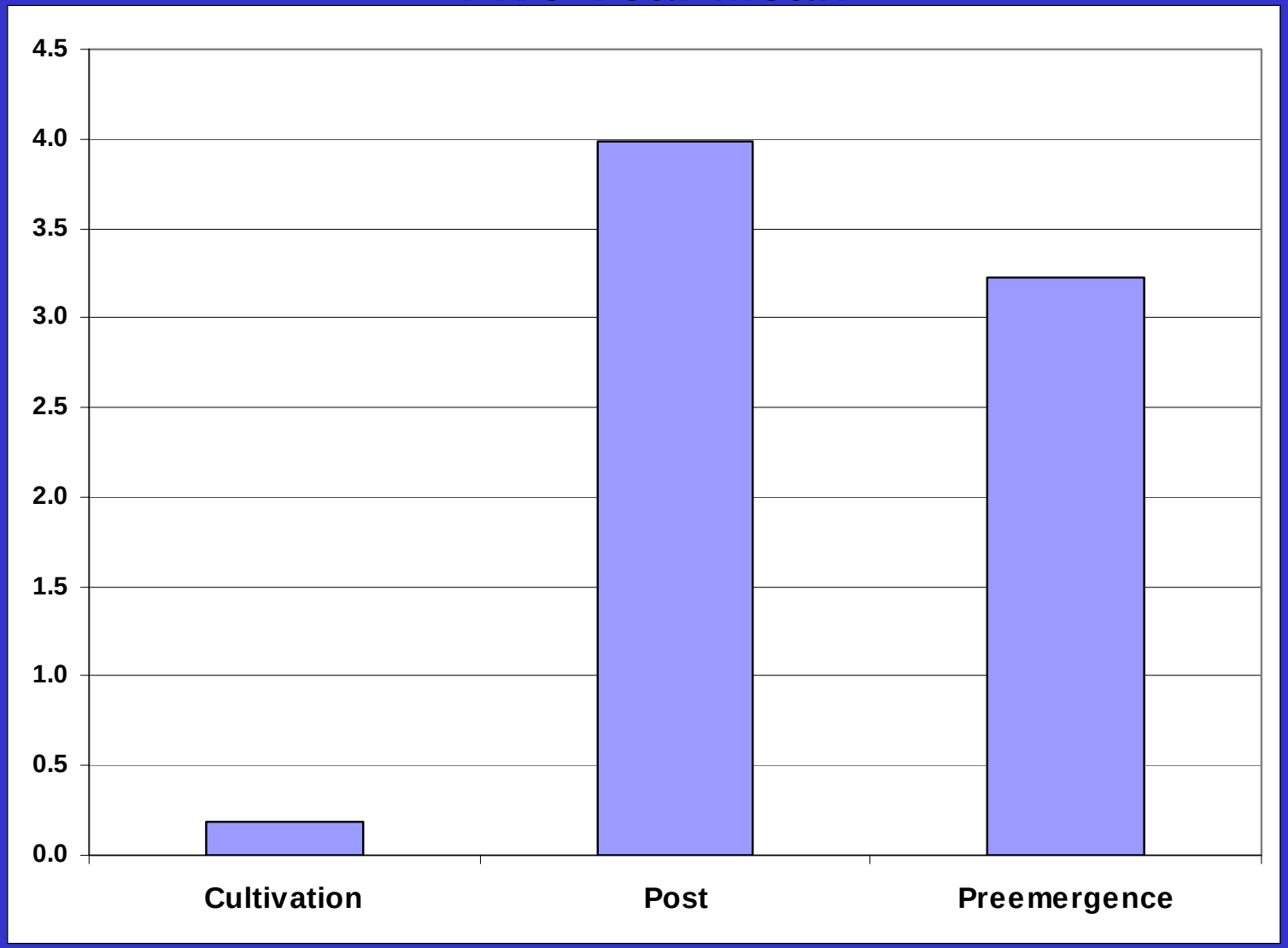

Purslane following cultivation
around base of vines

Post Emergent Treatment

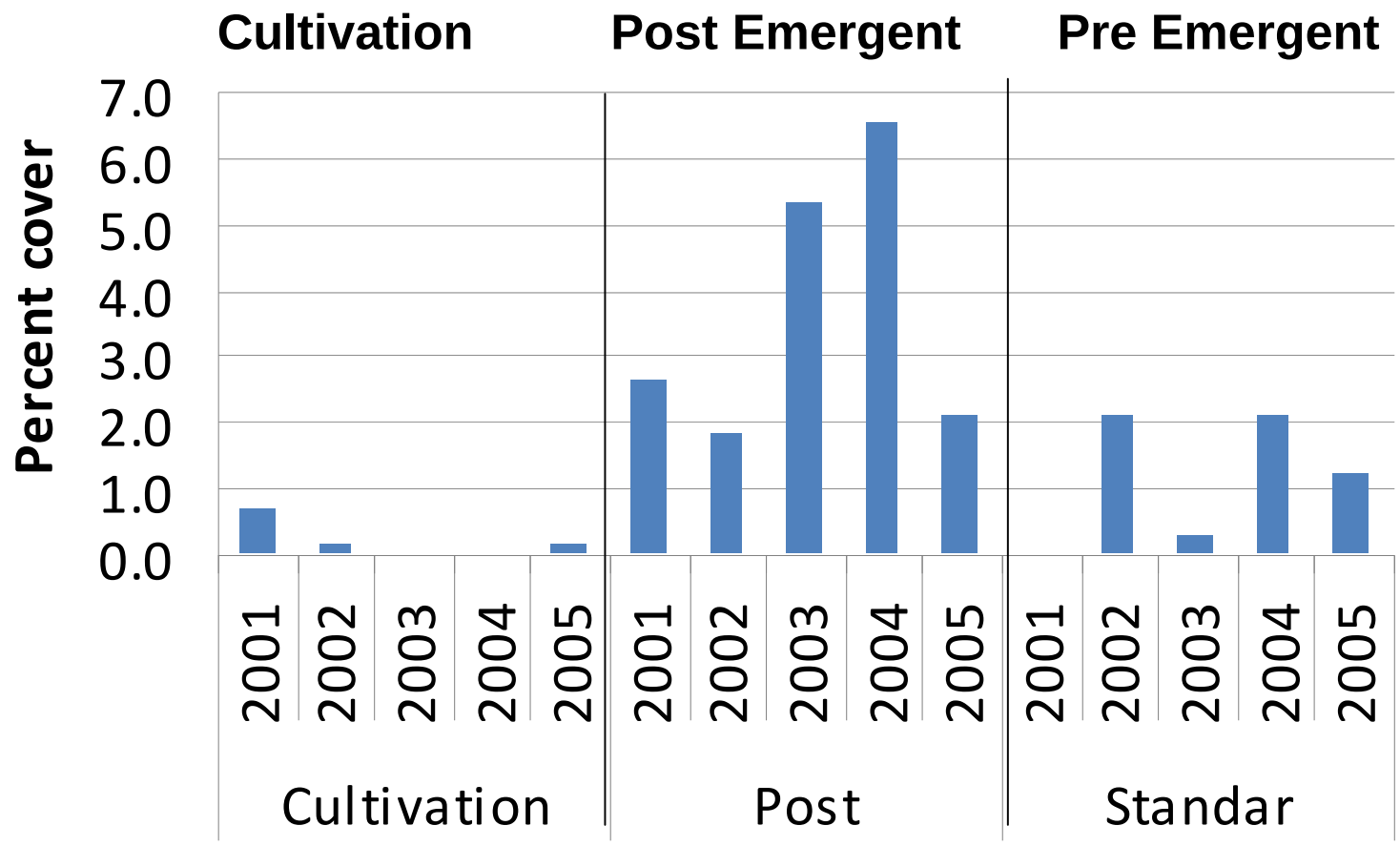
Post Emergence
Spot Applied

Percent Cover of Horseweed

Five Year Mean



Horseweed Population in Weed Control Treatments Over Five Years



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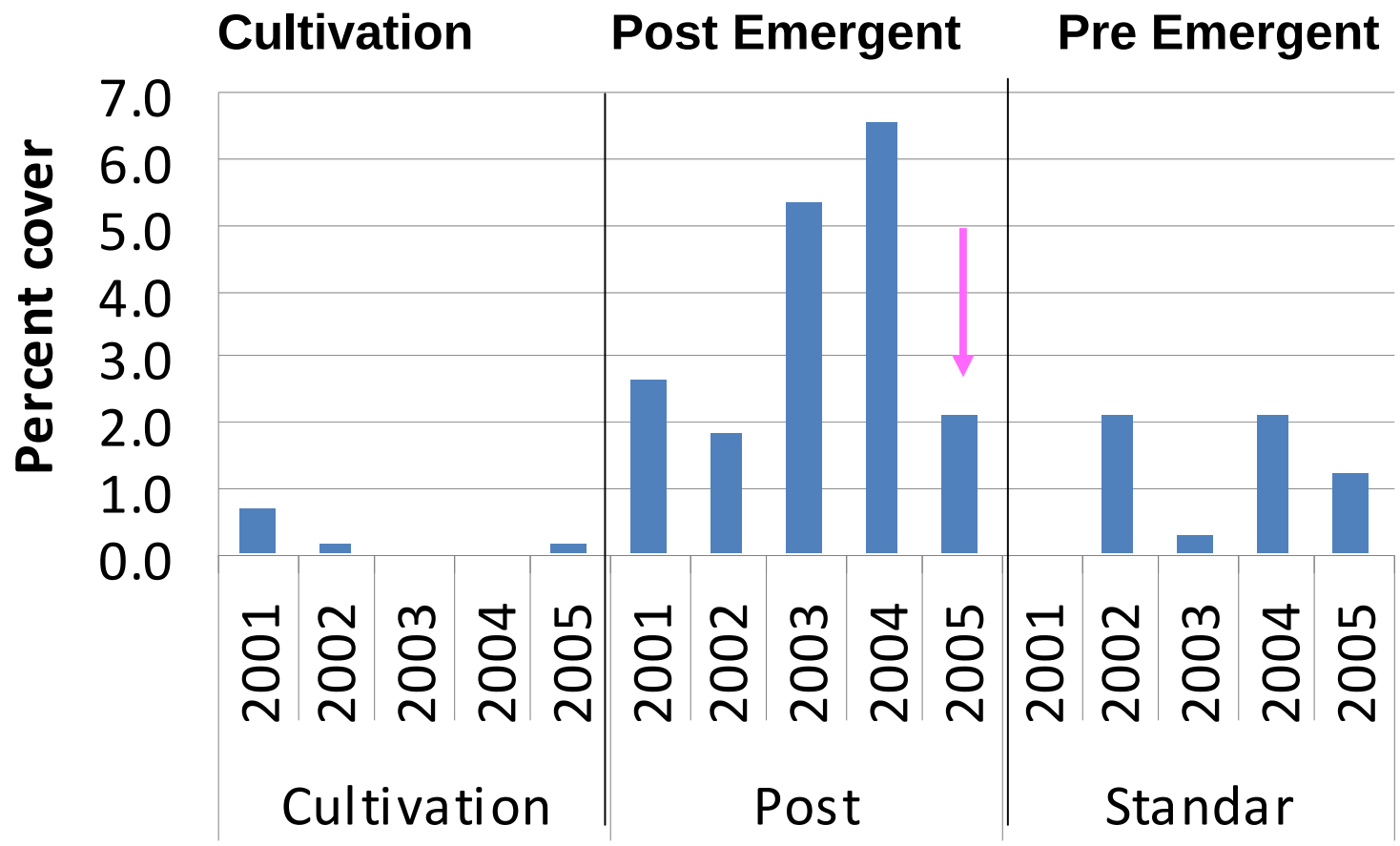

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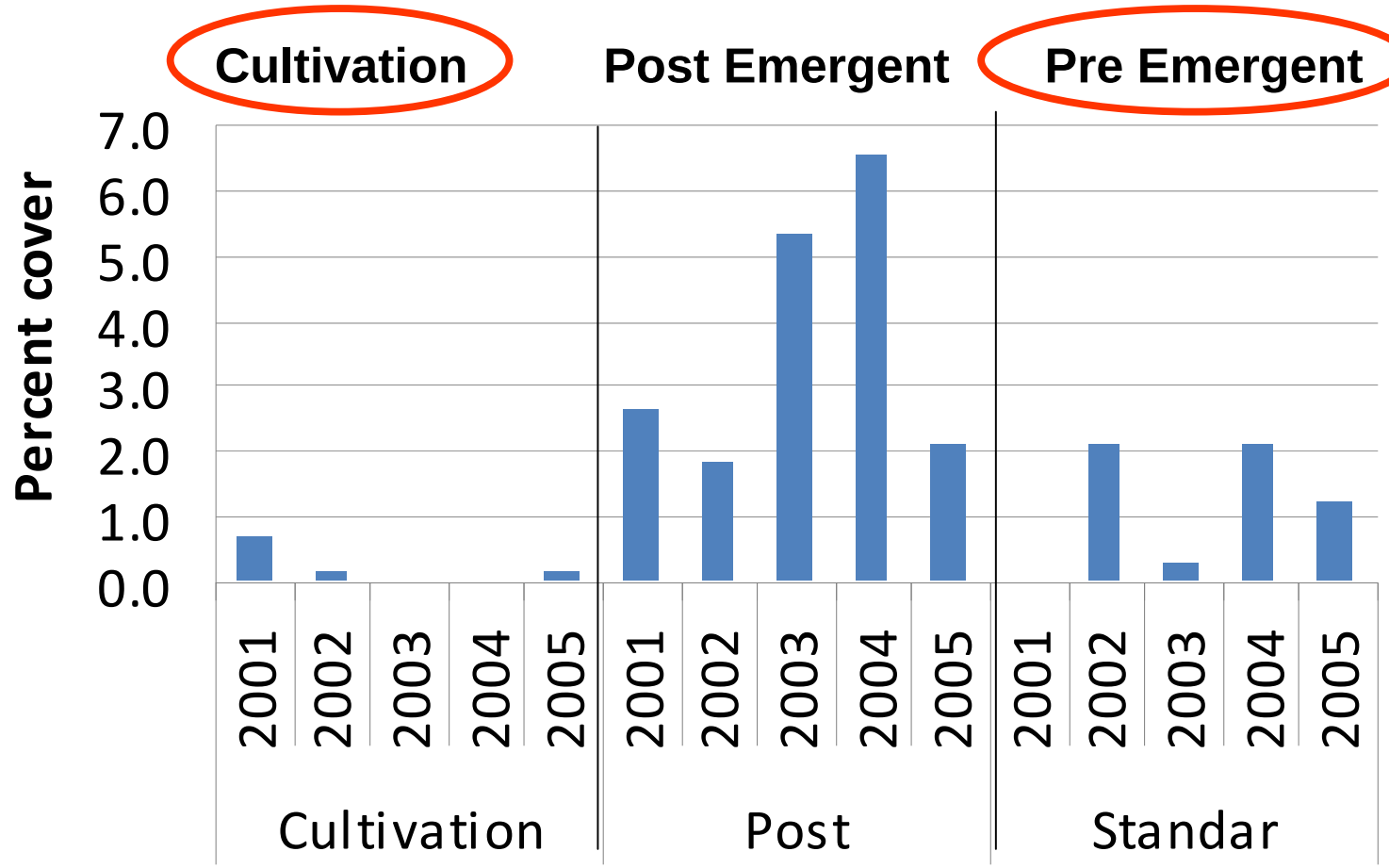



Horseweed
Susceptible to cultivation and Simazine
Tolerant of Roundup + Goal
Susceptible to Rely

Horseweed


Horseweed following treatment with Rely

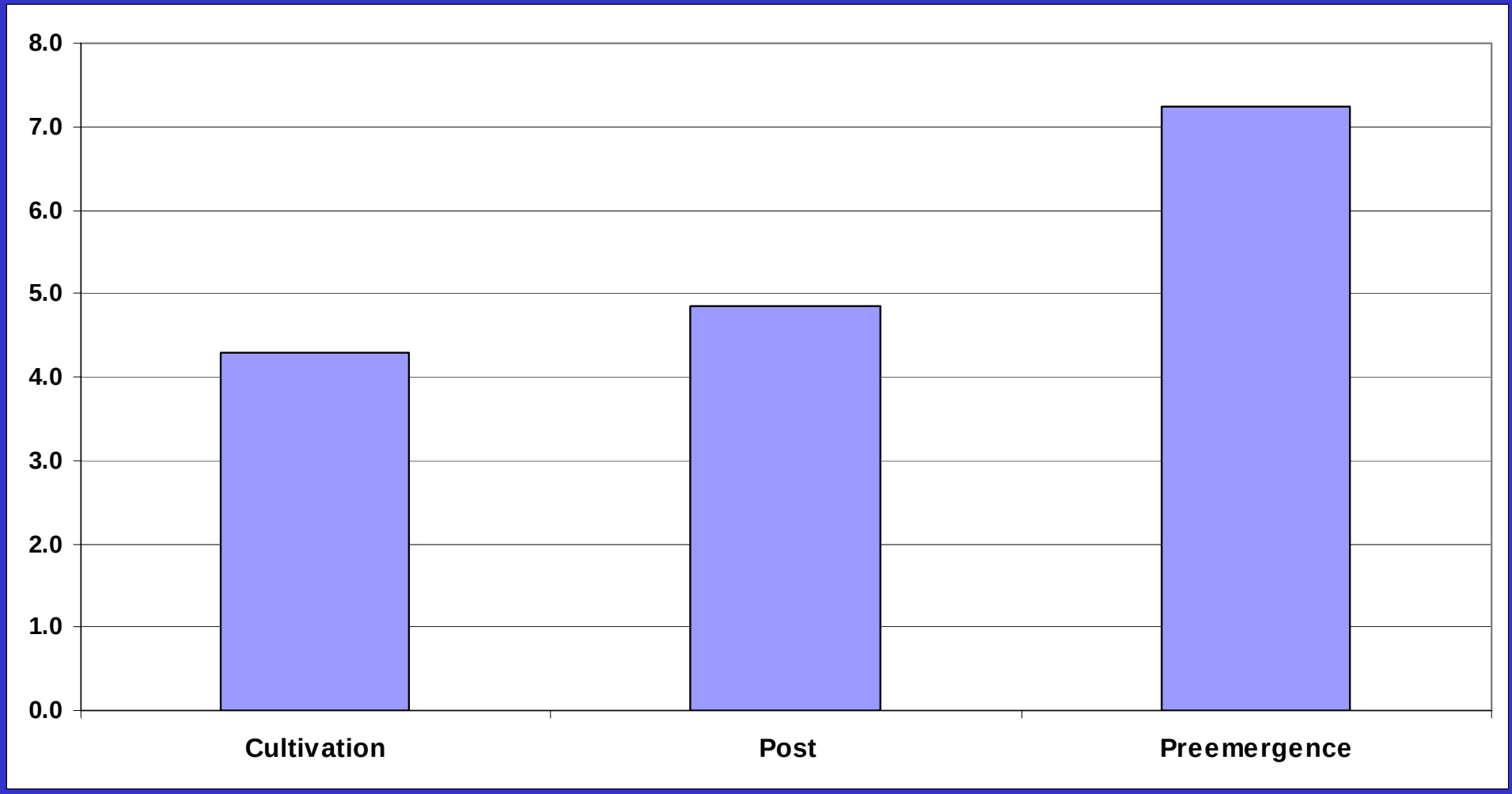

Post Emergent Treatment

Preemergence Treatment

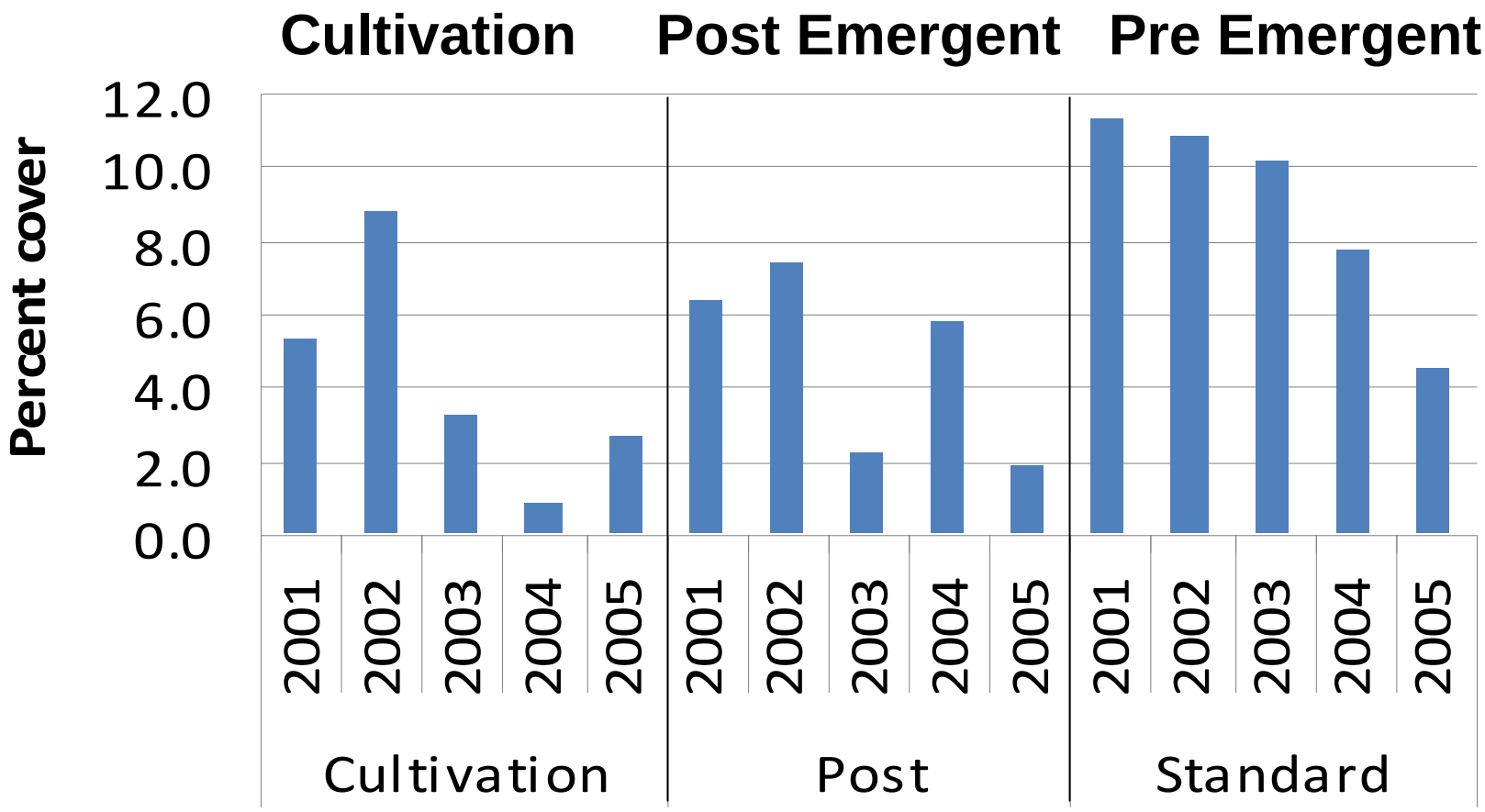
Preemergence Treatments Broadcast Applied

Post Emergence Spot Applied

Nutsedge Populations in the Preemergence Treatment Over Five Years

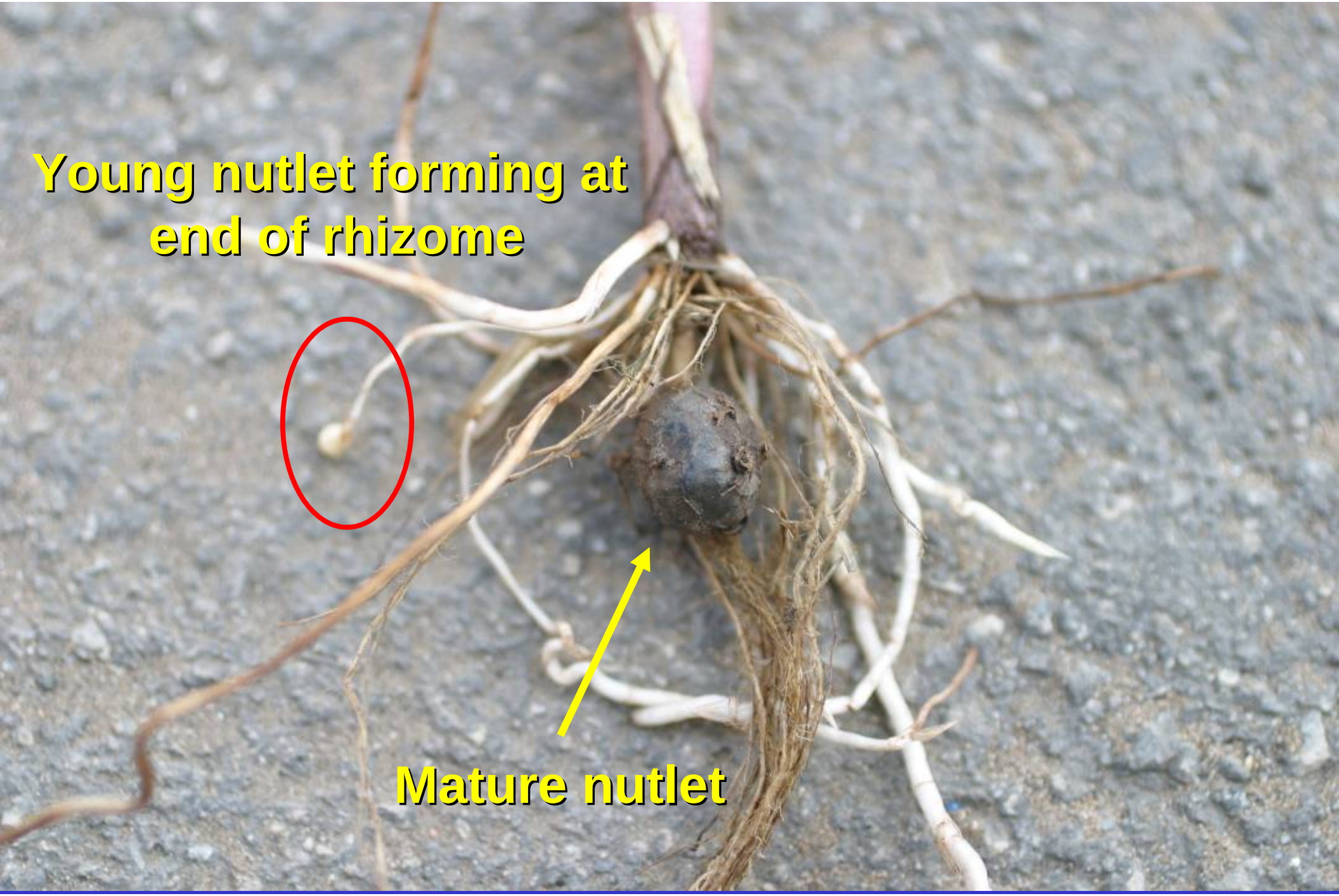


Nutsedge Population in Weed Control Treatments Over Five Years



Nutsedge Control with Glyphosate

- It is possible, but multiple applications are required
- Timing affects the effectiveness of applications
  - Early applications reduced nutlet formation
    - The glyphosate moves to the tips of the rhizomes
  - As plants matured the impact of glyphosate on tubers decreased as the tubers mature and become dormant


Young nutlet forming at end of rhizome
Mature nutlet

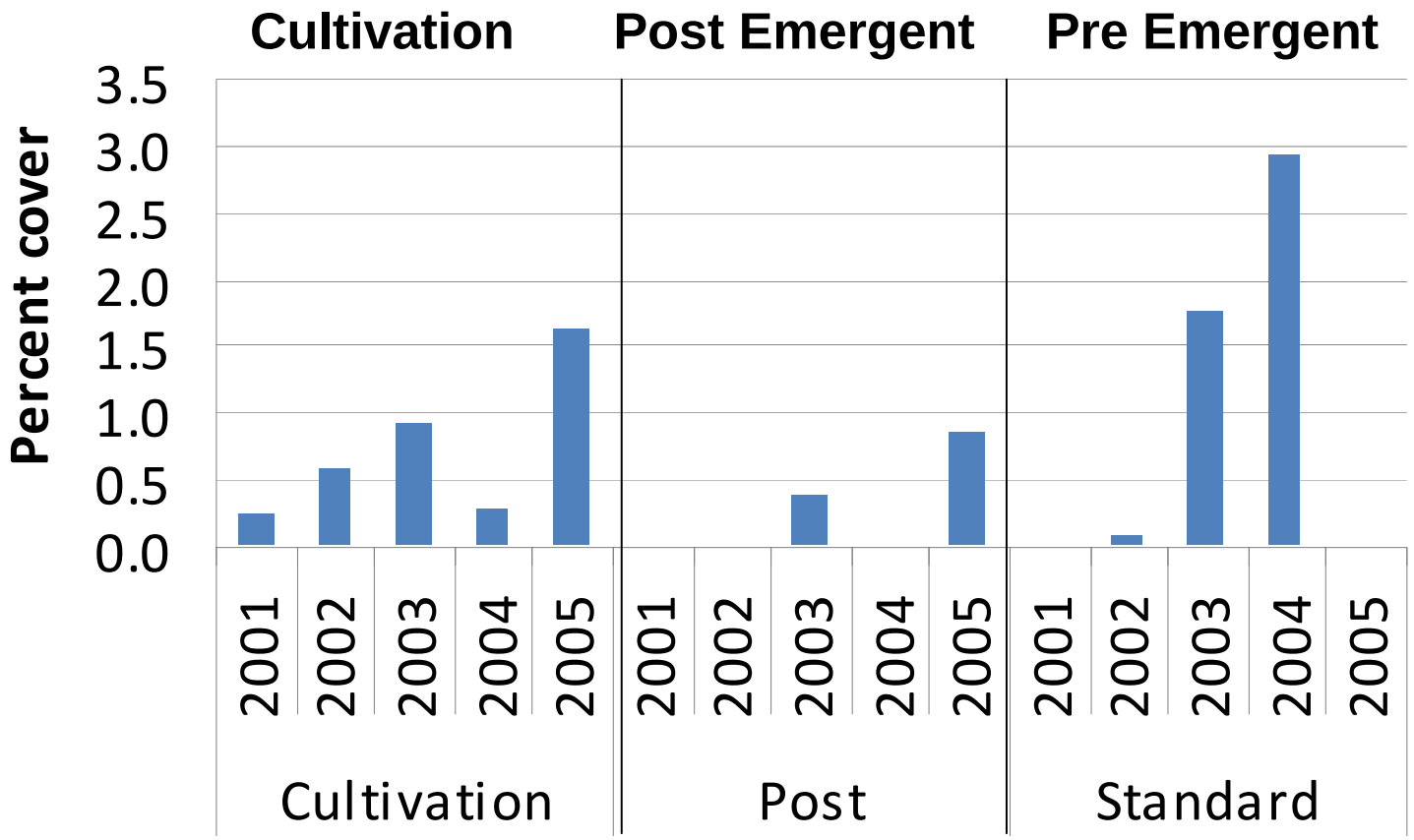

Nutsedge
Initially present at the site
burn back control by Roundup
but not capable of eradicating based
on the use pattern


Preemergence Treatment

Special Weed Concern


Knot Weed
Germinated along
the edge of the cover crop and
creped over to the vine row
Edge of
cover crop

Knotweed Population in Weed Control Treatments Over Five Years



Effect of Weed Control Treatments on Plant and Soil Nutrition Over Five Years

Plant Nutrition

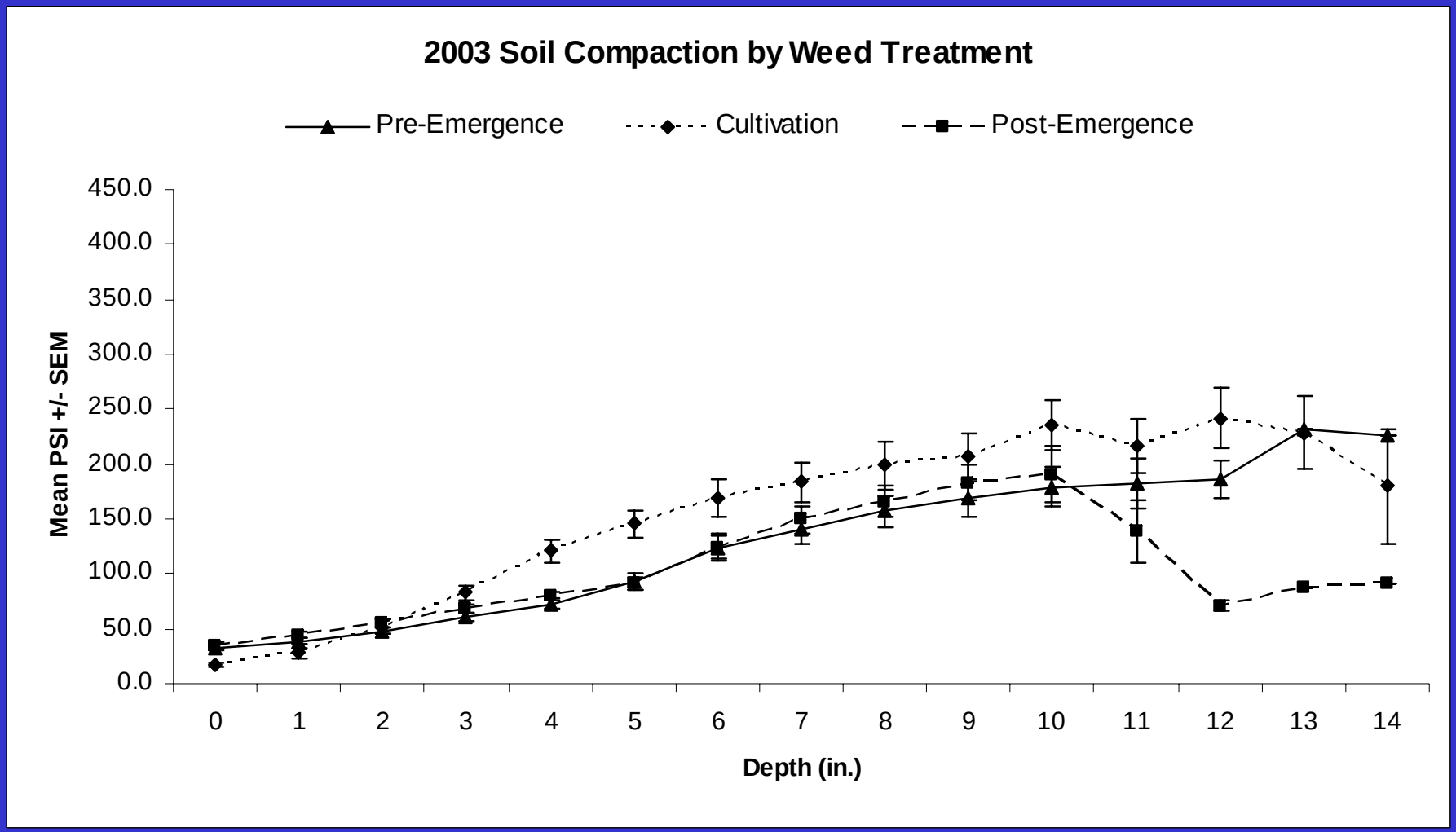
- Weed treatments had no effect on leaf blade or petiole nutrient levels in any year

Soil Nutrient Status

- Nitrate was lower in the cultivation treatment in 2005
- Extractable Zinc was lower in 2003 and 2005

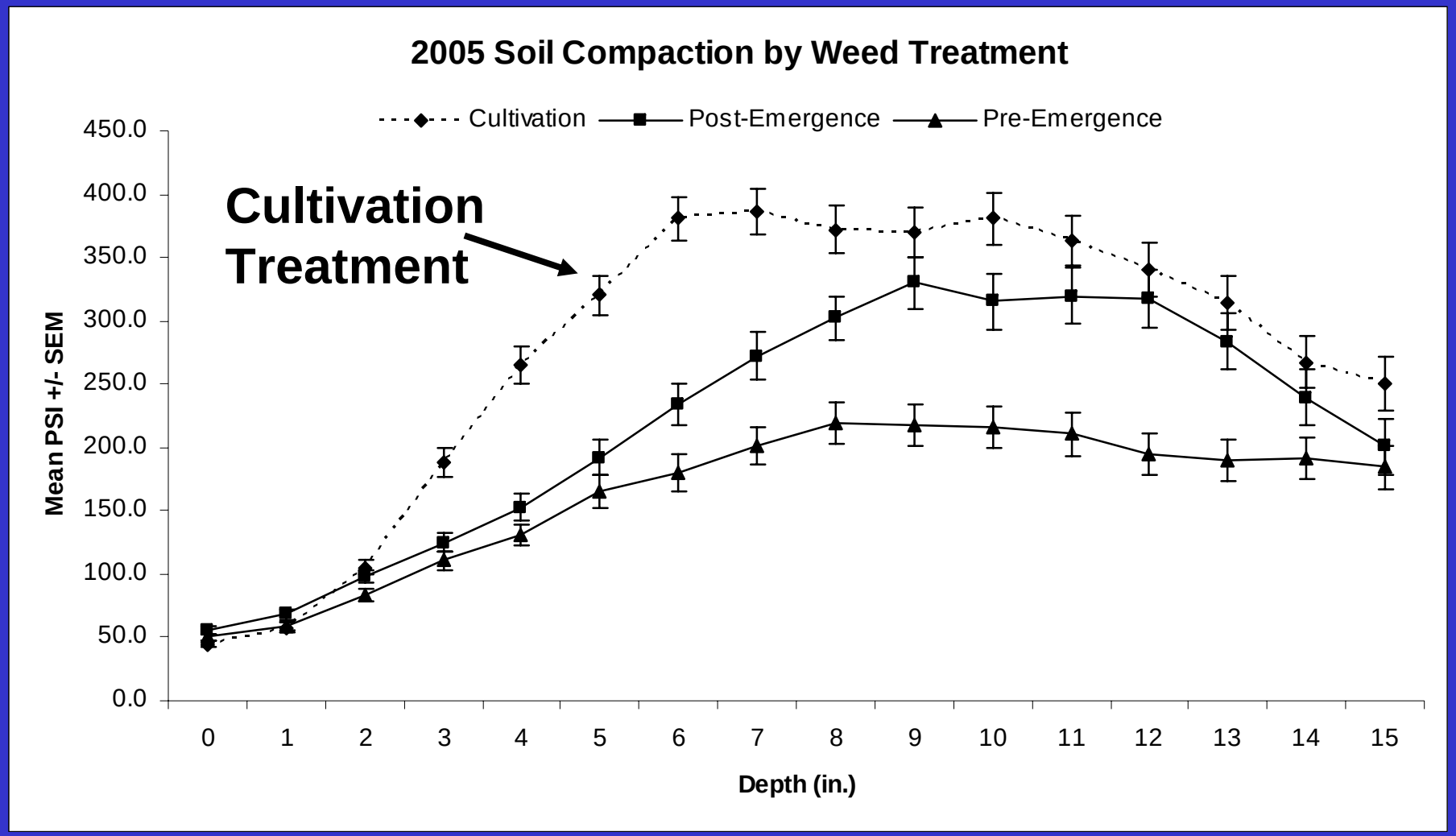
Soil Physical Properties

2003 Soil Compaction Evaluation

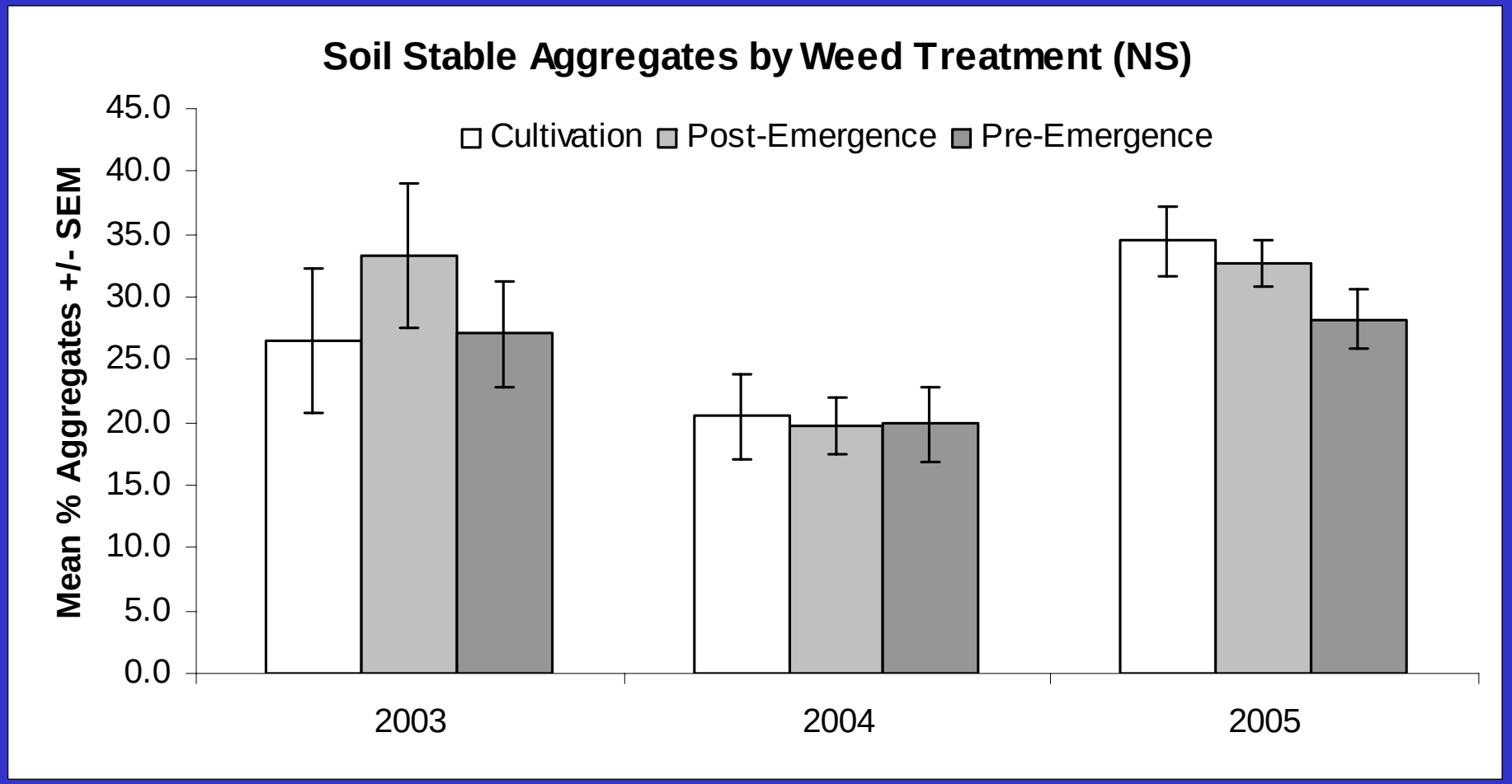


2005 Soil Compaction Evaluation

Pounds per Square Inch

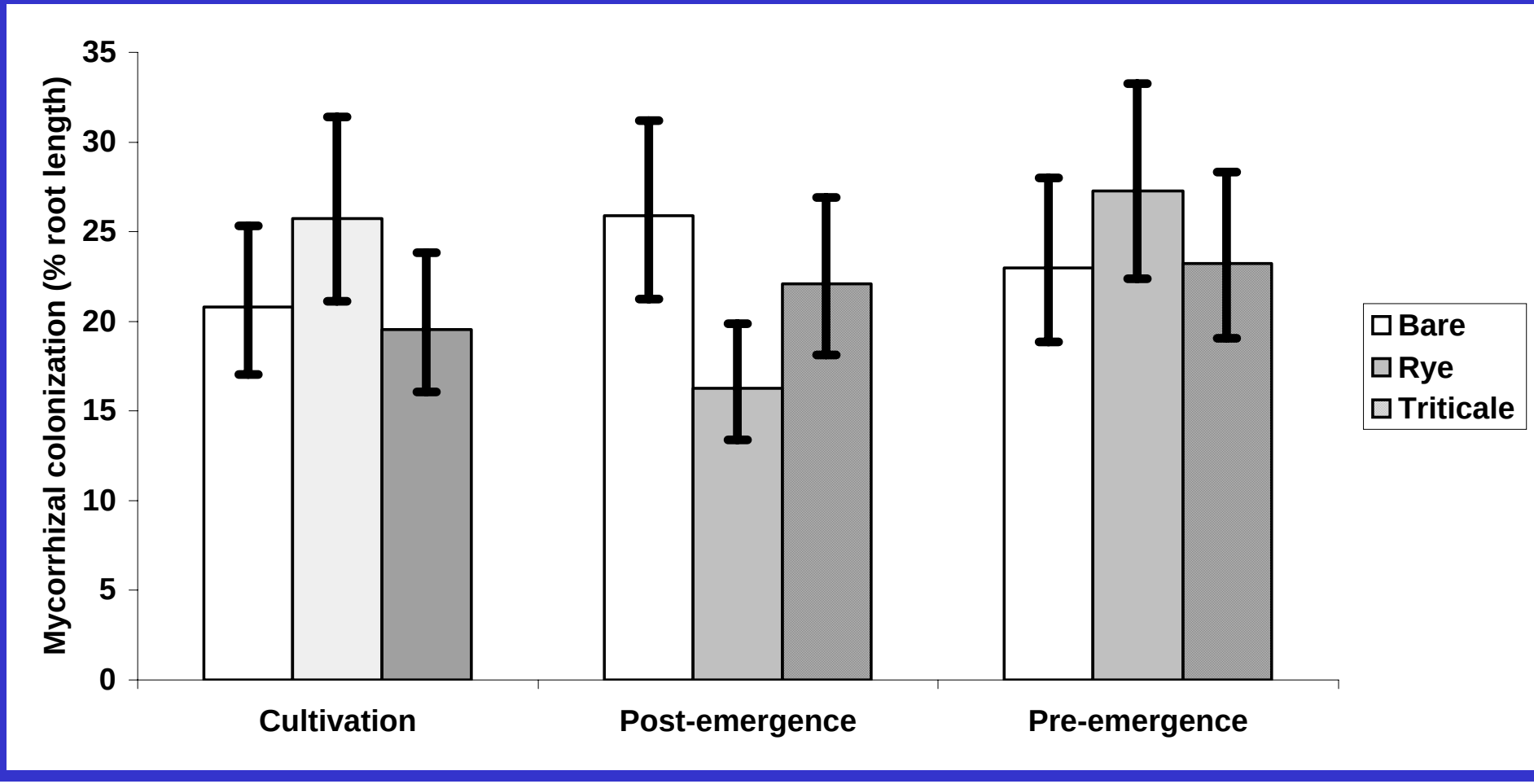


Water Stable Soil Aggregates

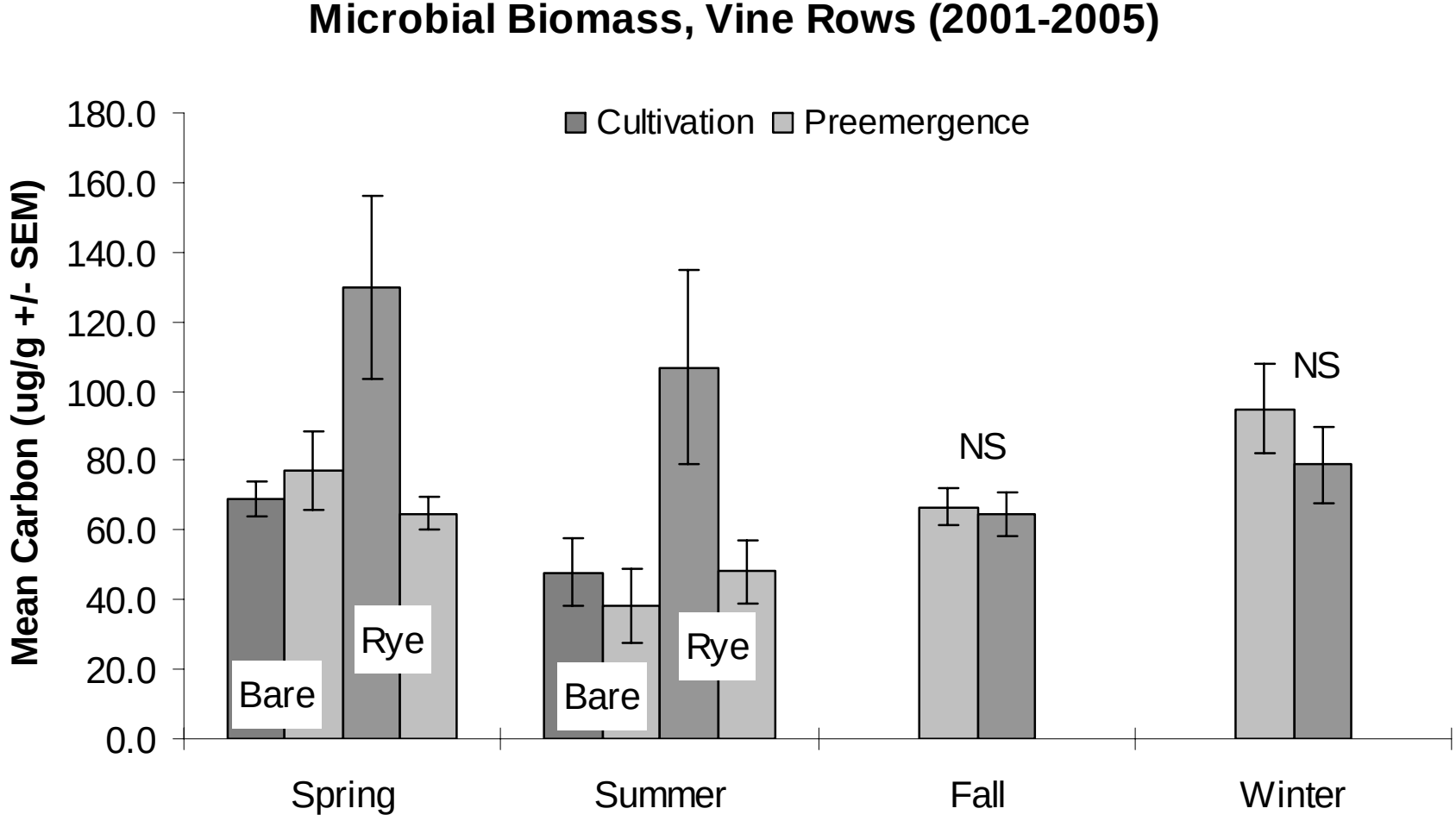


Soil Microbiological Properties

Impact on Mycorrhiza Weed Control Treatments Interaction with Adjacent Cover Crops 2003-2005



Microbial Biomass In Vine Rows



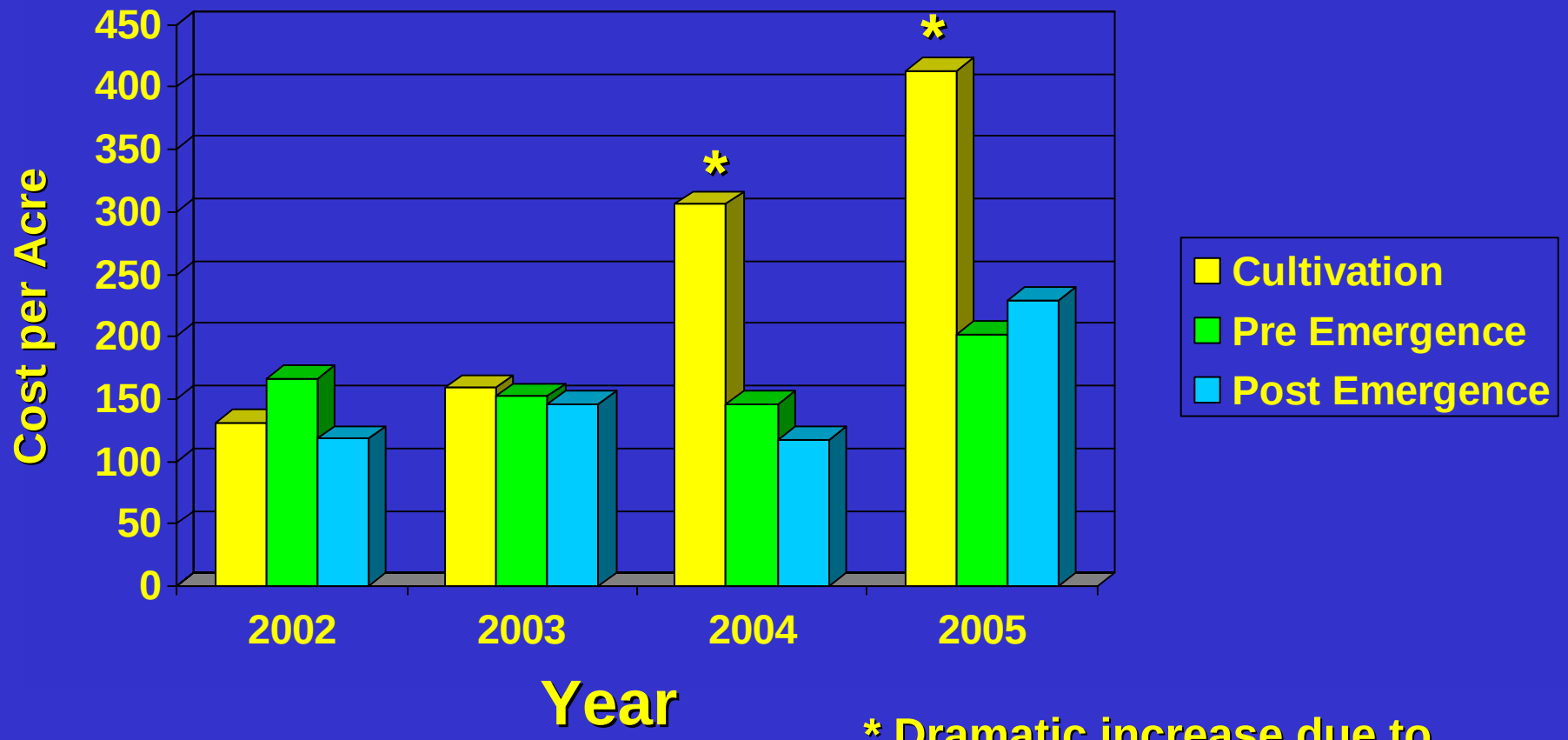
Impact of Weed Control Treatments on Grape Yield

- Weed control treatments had no effect on vine growth
- Cover crop treatments, when averaged over the five years, also had no significant effect on vine growth
- However, in 2001 and 2005 the triticale ‘Trios 102’ treatment significantly reduced pruning weights
- Lowered pruning weights may be related to later growth, thus greater soil water use, by ‘Trios 102’ than ‘Merced’ rye or bare row middles

Impact of Weed Control Treatments on Grape Quality

- No differences in crop yield or fruit composition were measured from 2001 to 2005 due to weed control treatments

Comparison of Weed Control Costs



* Dramatic increase due to hand weeding

Cover crops killed at different ages

Acknowledgements:

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