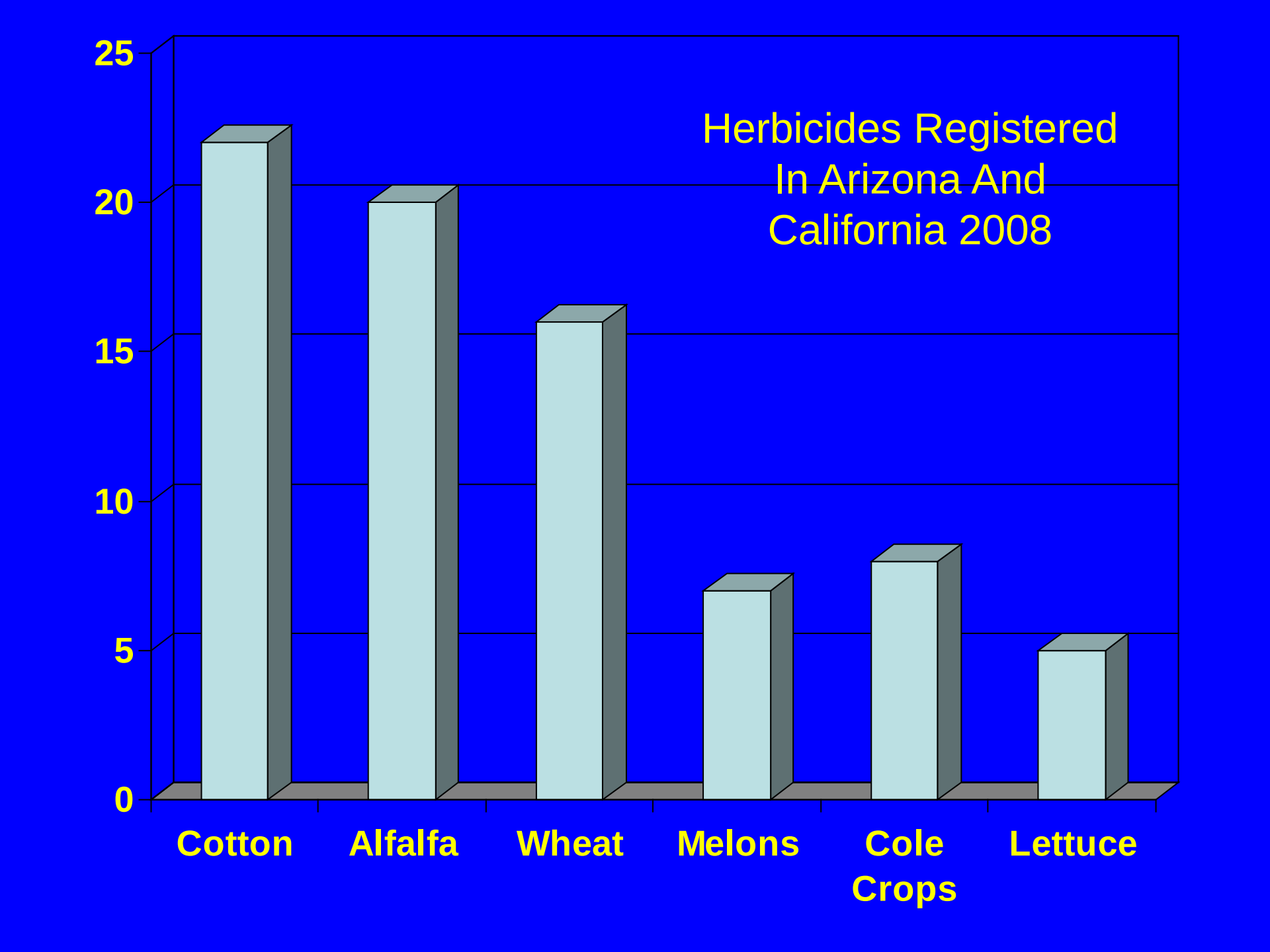
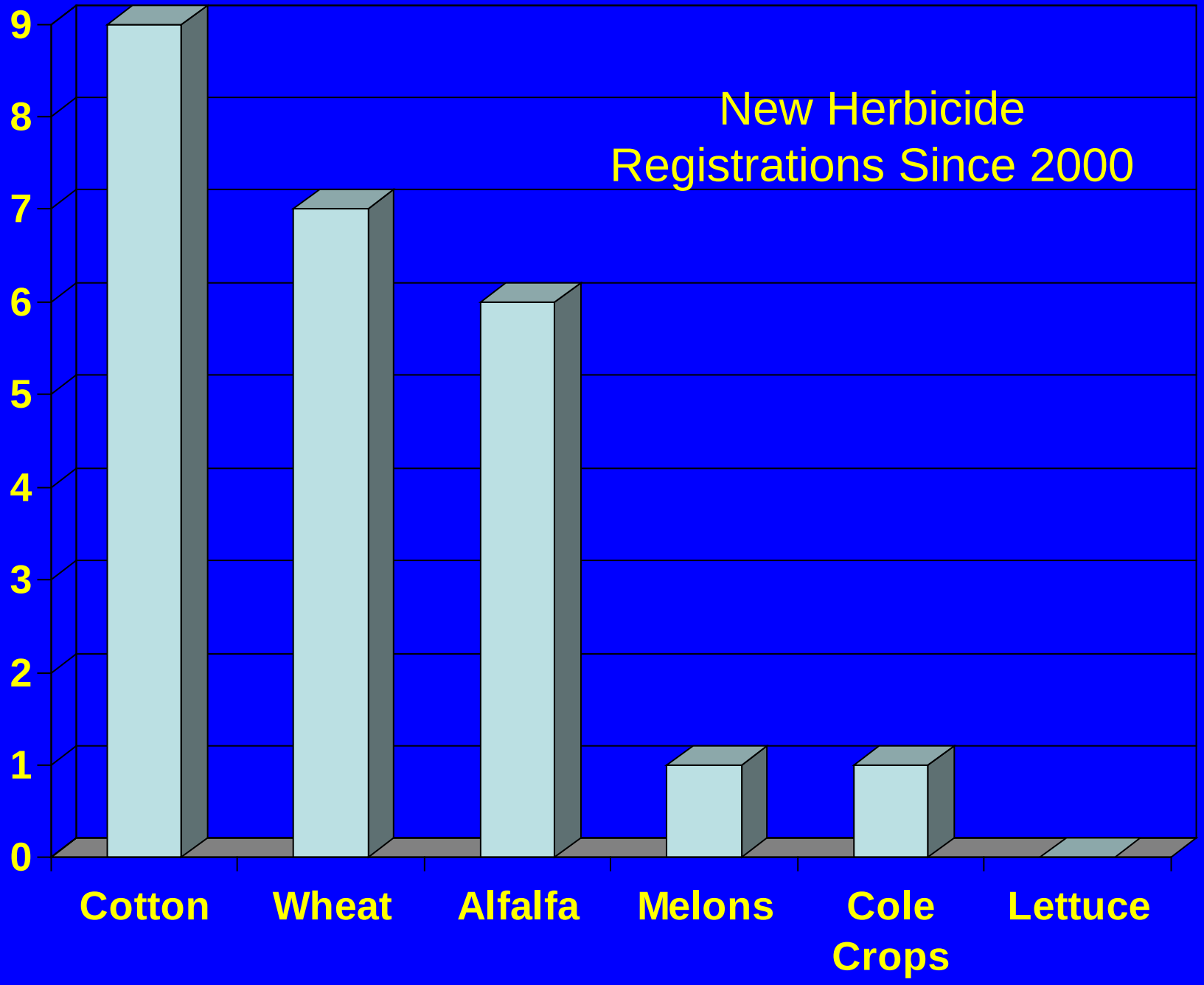
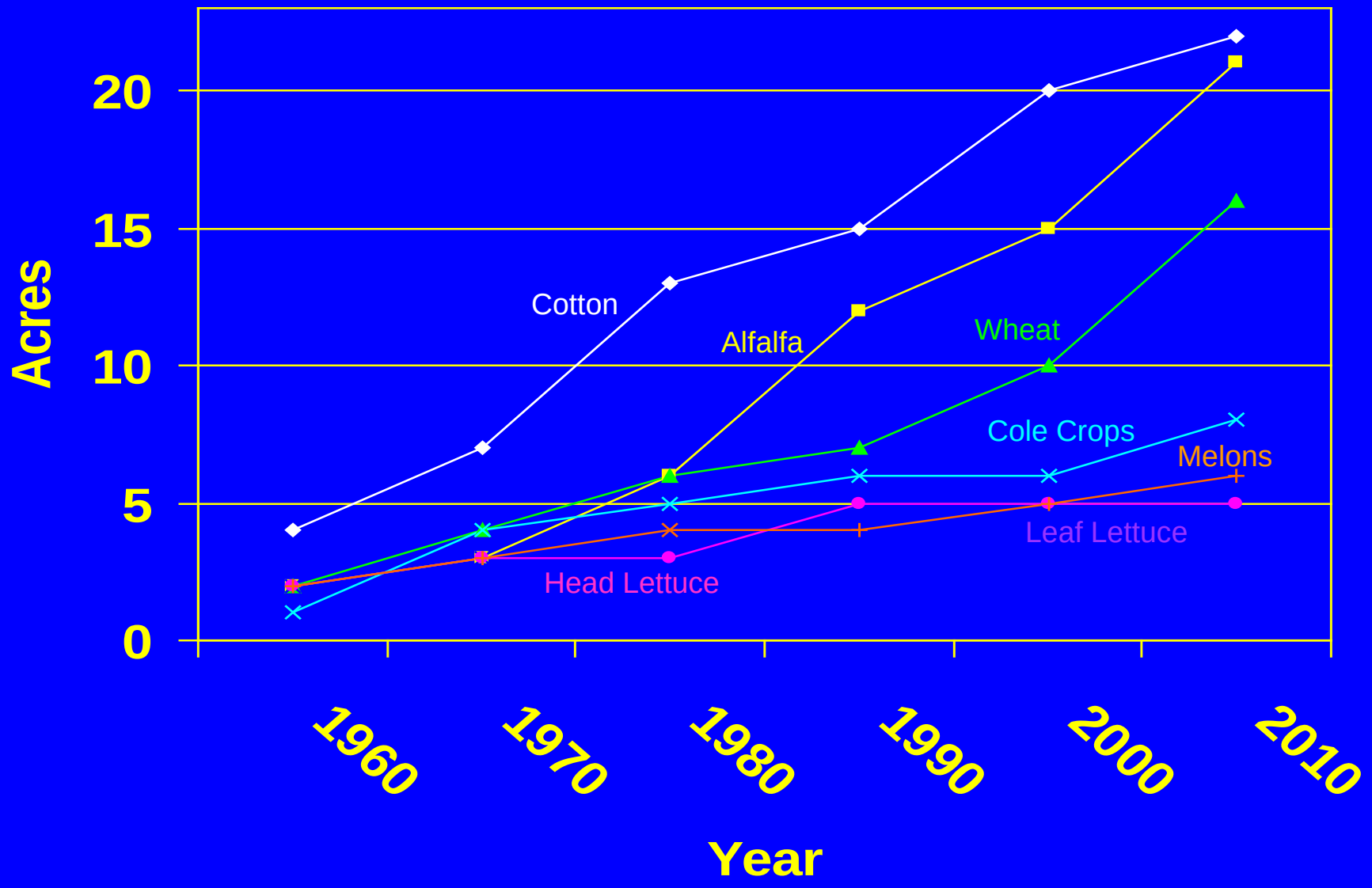
“Vegetable Weed Control in the Desert”

Barry Tickes
University of Arizona
Yuma Agricultural Center


Herbicides Registered
In Arizona And
California 2008
25
20
15
10
5
0
Cotton
Alfalfa
Wheat
Melons
Cole
Crops
Lettuce


New Herbicide
Registrations Since 2000
9
8
7
6
5
4
3
2
1
0
Cotton
Wheat
Alfalfa
Melons
Cole Crops
Lettuce

Herbicide Registrations



Lettuce Weed Control/ Low Deserts

Barry Tickes
University of Arizona
Revised 6-08

				Grasses		Mustards			Goosefoot		Sunflower			Nightshade		Other			
Herbicide	**CA/AZ**	Year first registered or **expected**	Available as a generic	Summer Annual	Winter annual	London Rocket	Shepardspurse	Wild mustard	Lambsquarters	Nettleleaf Goosefoot	Sowthistle	Sunflower	Prickly Lettuce	Groundcherry	Silverleaf Nightshade	Purselane	Malva	Pigweed	**Comments**
Balan	CA/AZ	1965	Y	●	●	○	○	○	●	●	○	○	○	○	◗	●	○	●	Must be mechanically incorporated. Do not concentrate on bed top or injury can occur.
Prefar	CA/AZ	1968	N	●	●	○	○	○	◗	●	○	○	○	○	○	●	○	●	Incorporate with high volume of sprinkler irrigation to push down to where weed seeds are germinating.
Kerb	CA/AZ	1969	N	●	●	●	●	●	●	●	○	○	○	◗	◗	●	◗	◗	Will leach below weed seeds if applied too early or with too much sprinkler water. Delayed application often necessary.
Poast	CA/AZ	1984	Y	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	Will not control annual bluegrass or Sprangletop. Always use COC.
Select	CA/AZ	1987	Y	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	Use highest rates to control annual bluegrass and Sprangletop. Can use either NIS or COC with Select Max but only COC with Select

● Good Control ◗ Partial Control ○ No Control

Lettuce Weed Control/ Low Deserts

Barry Tickes
University of Arizona
Revised 6-08

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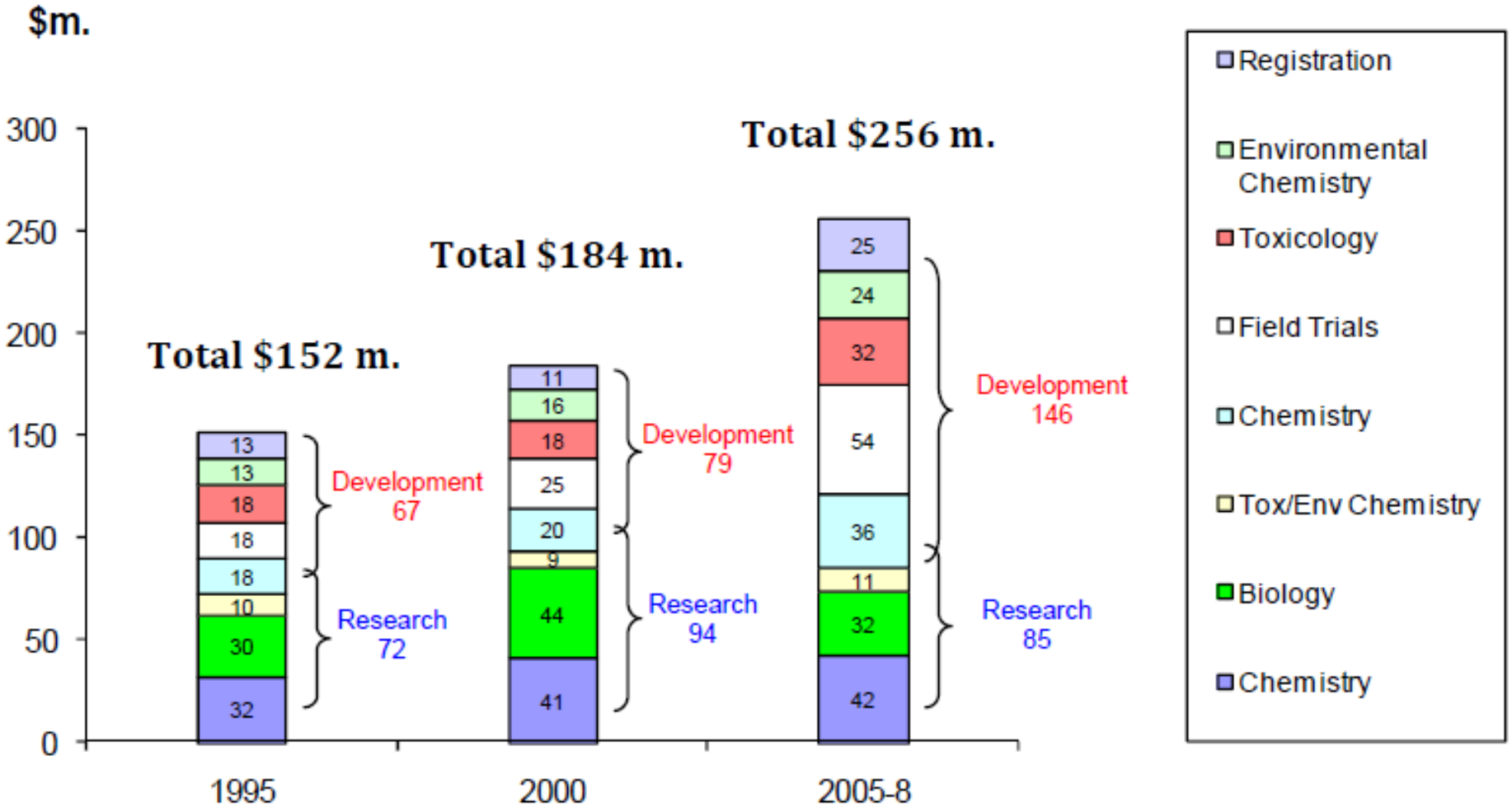
Modern Chemical Era: *in the last 15 years…….*

	Chemistry	Products	Spectrum
1.	Neonicotinoids	Admire, Assail…	Whitefly, aphid, beetles
2.	Spinosyns	Success, Radiant	Worms, leafminers, thrips
3.	Diacylhydrazine	Confirm, Intrepid	Worms
4	Pyridine	Fulfill	Aphids
5.	Pyridine - IGR	Knack	Whiteflies
6.	Oxadiazine	Avaunt	Worms
7	Thiadiazine	Courier	Whiteflies
8.	Carbozimide	Beleaf	Aphids
9.	Diamides	Coragen, Synapse	Worms, Leafminers
10.	Ketoenols	Oberon, Movento	Aphids, Whiteflies

U.S Crop Acreage 2008

Field Corn	86,351,000
Soybeans	75,718,000
Wheat	55,685,000
Alfalfa	20,980,000
Cotton	9,470,000
Head Lettuce	151,000
Broccoli	126,000
Romaine	82,5000
Leaf Lettuce	53,9000
Spinach	37,400
Cauliflower	36,910

Discovery and Development Costs of a New Crop Protection Product

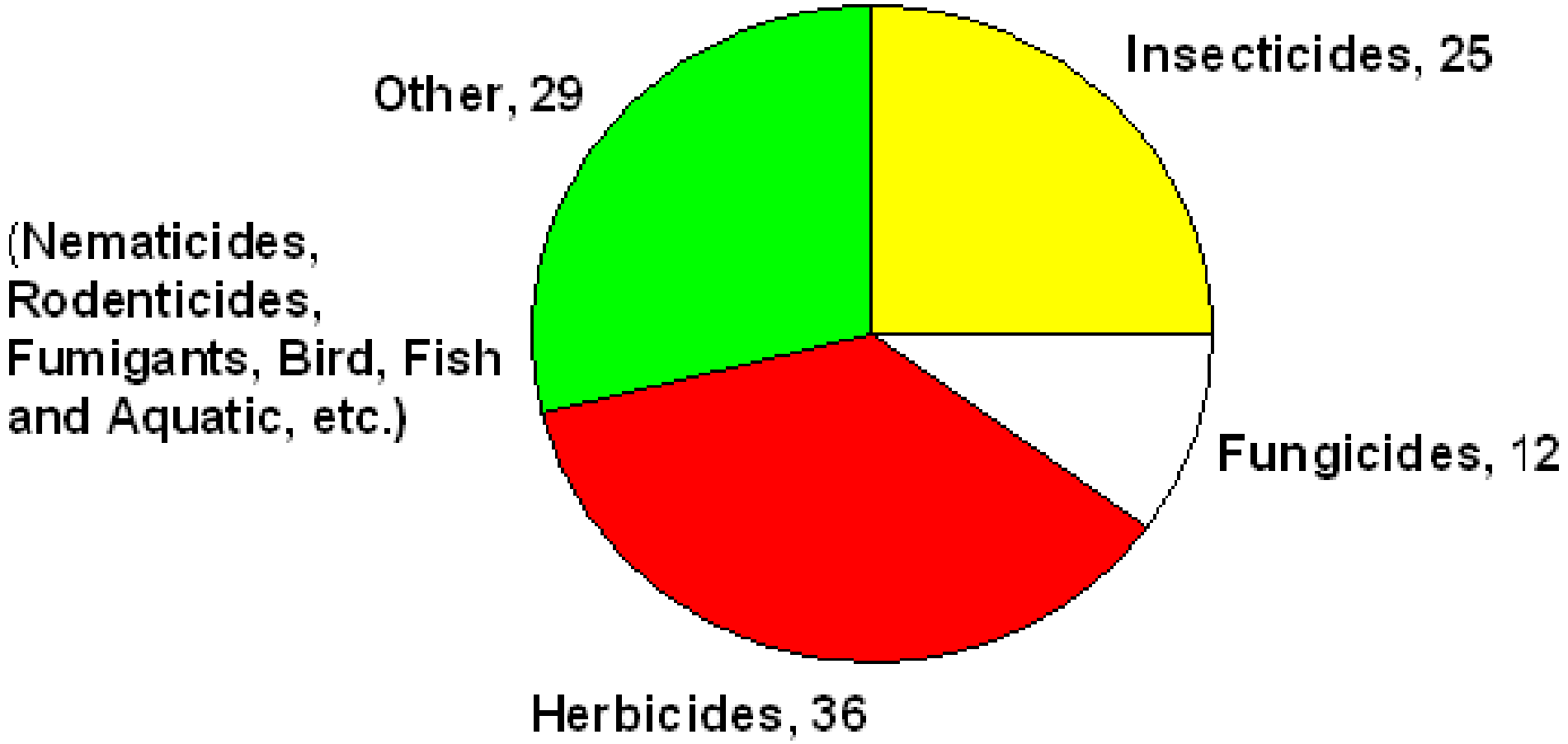


P. McDougall (Crop Life America and European Crop Protection Assn.)

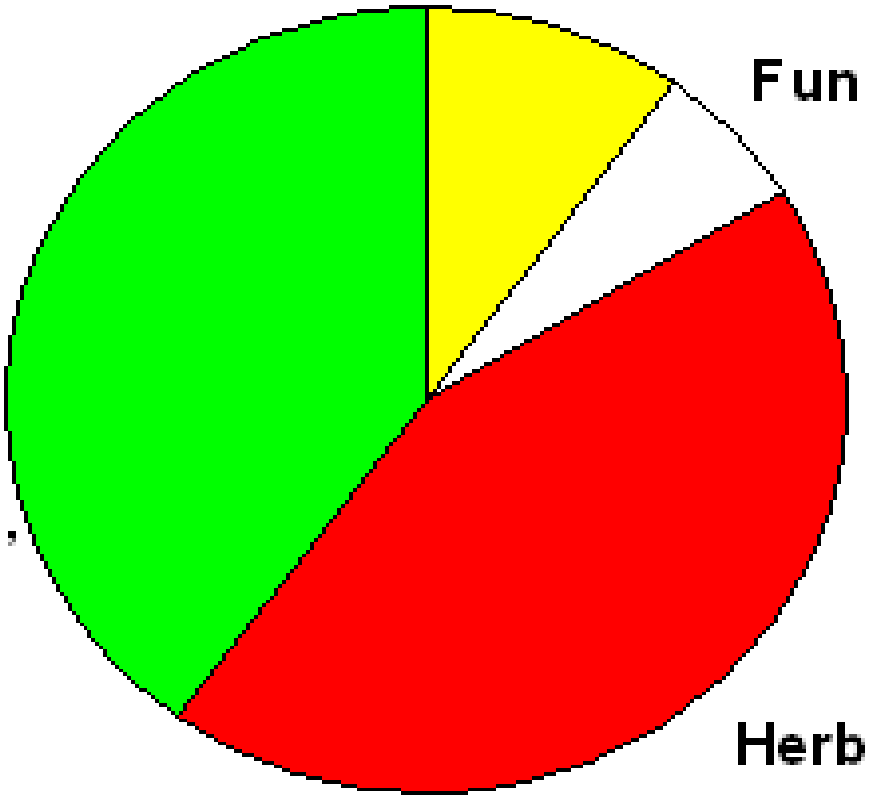
Crop Protection Product Discovery and Development Lead Time

	1995	2000	2005-8
Number of years between the first synthesis and the first sale of the product	8.3	9.1	9.8

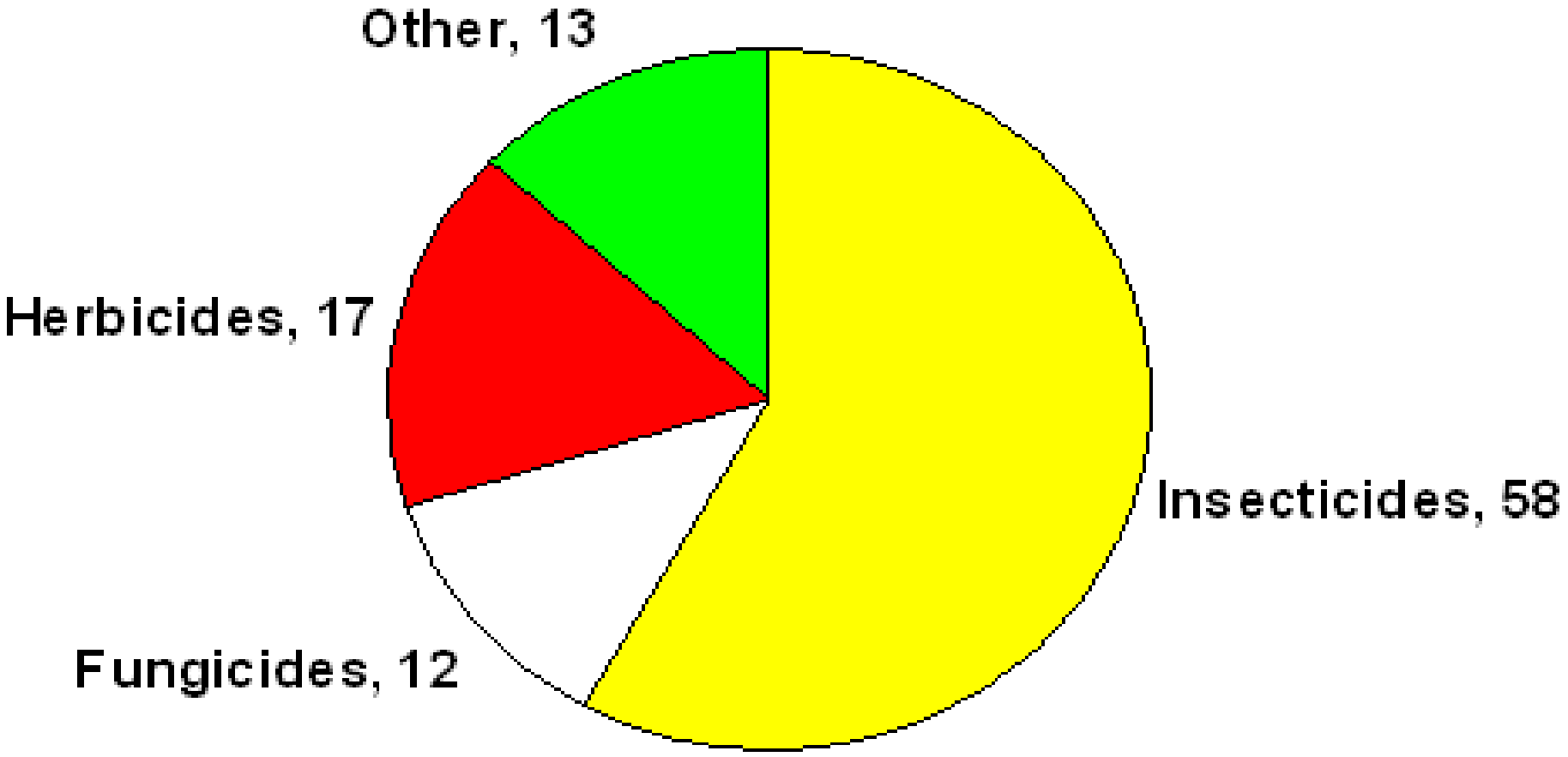
World Pesticide Use
Acres Treated (% of total)
2000



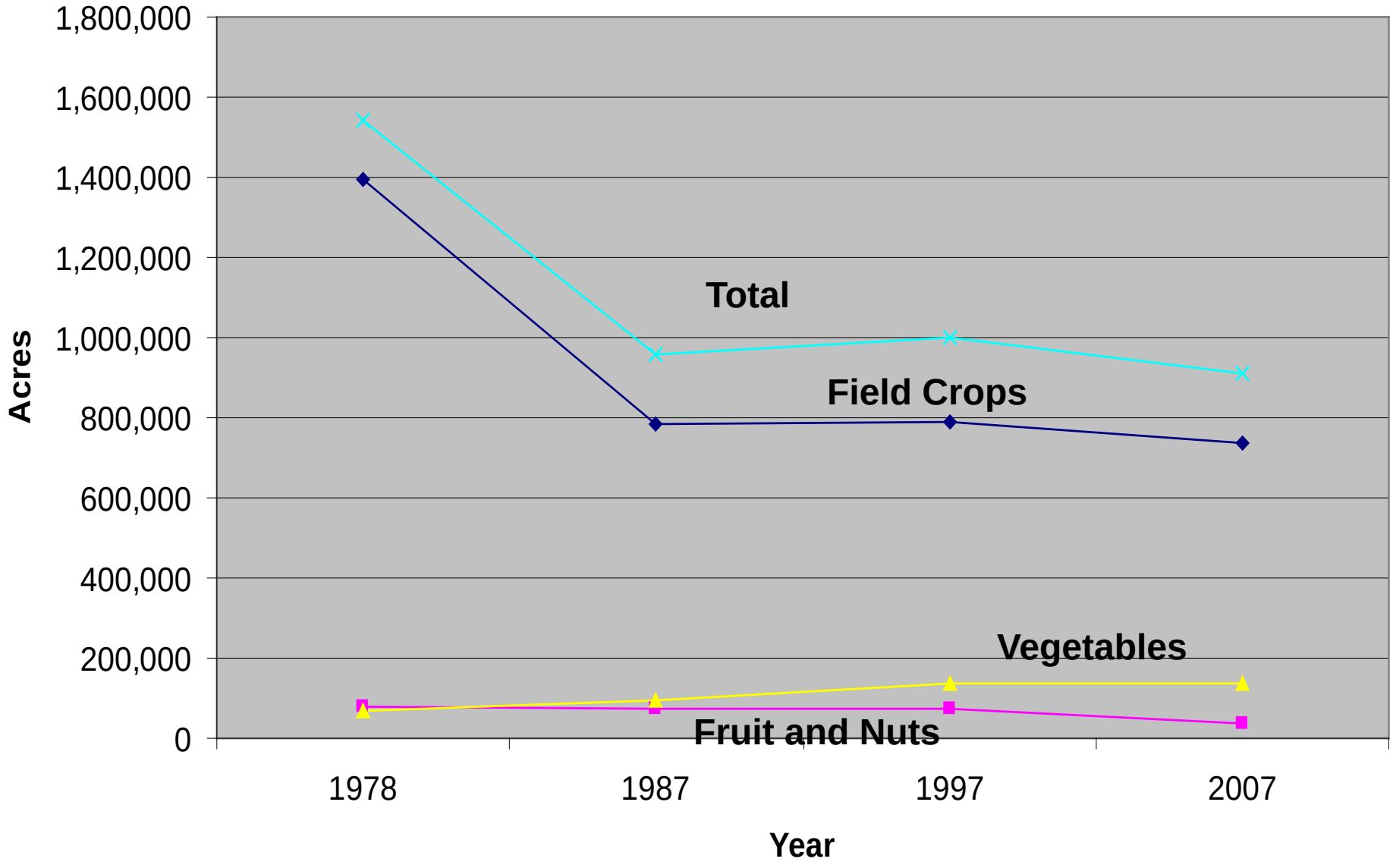
U.S. Pesticide Use
Acres Treated (% of total)
2001

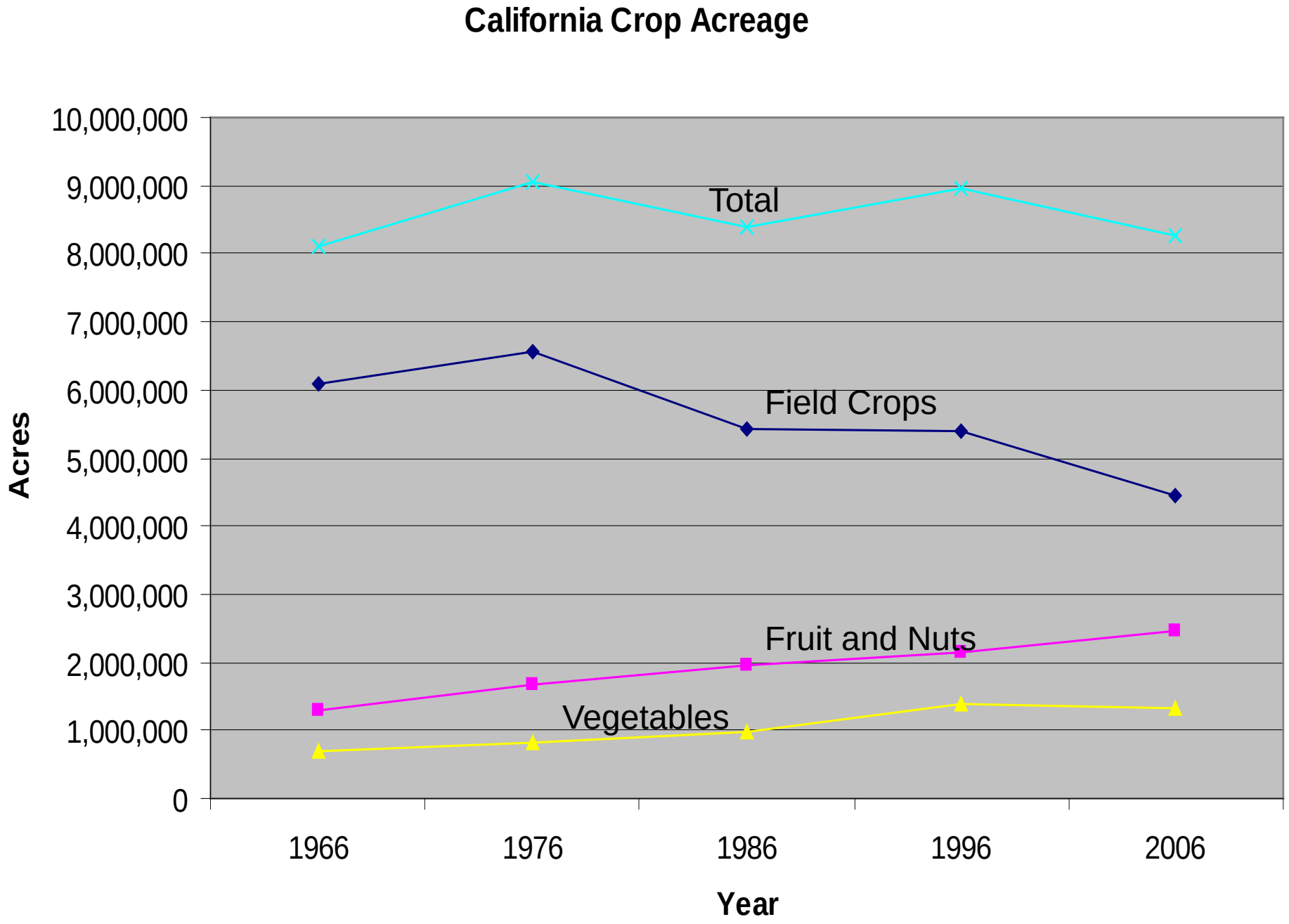


Arizona Pesticide Use
Acres Treated (% of total)
2005



Arizona Crop Acreage




California Crop Acreage
10,000,000
9,000,000
8,000,000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
Acres
Total
Field Crops
Fruit and Nuts
Vegetables
1966
1976
1986
1996
2006
Year


Treflan/sudan

Herbicide	Vegetable crop(s)	Date First Registered	Date New Registrations
EPTC (Eptam)	Carrots	1960	2009
Linuron (Lorox)	Spinach	1962	In progress
DCPA (Dacthal)	Cole crops, Onions (Formulation)	1965	2002
Bentazon (Basagran)	Onions, carrots	1968	In progress
Pronamide (Kerb)	Lettuce (Formulation & Chemigation	1969	2004 and in progress
Napropamide (Devrinol)	Lettuce	1969	In progress
Pendimethalin (Prowl H2O)	Cole crops, onions, transplanted lettuce (Formulation change)	1975	In progress
Oxyfluorfen (GoalTender)	Cole crops, onions, celery, leeks (Formulation change)	1976	2005
Metolachlor (Dual Magnum)	Spinach, carrots, transplanted lettuce	1977	In progress
Clopyralid (Stinger)	Cole crops	1987	2003
Dimethenamid (Outlook)	Carrots, onions	1993	In progress
Halosulfuron (Sandea)	Melons	1993	2004
Carfentrazon (Aim)	Melons, transplanted fruiting vegetables	2000	In progress
Flumioxazin (Chateau)	Onions, asparagus	2001	In progress


Untreated
Eptam 3.5 pt. (3X)


Dow AgroSciences
GoalTender®
Herbicide
Dow AgroSciences
Goal®
2XL
Herbicide

Prowl H_2O

Prowl 3.3

Dacthal

DACTHAL FLOWABLE

Dacthal W 75

Kerb 50W

Rates: 1-2 lbs.

Kerb 3.3

Rates: 1.2 - 2.4 pts.

Kerb Chemigation Applicators








GoalTender Chemigation Equipment


GoalTender 6oz.
Untreated

General Search of Food Request Database

Submit Me-Too Request
View Performance/Crop Safety Data

IR-4 Food Use Request

Print (IR-4 Report)
Export to XLS

Pr#: (=Protocol) Priority	Pesticide(MFG)	Commodity (Crop Group)	Project Status	MRID# EPA Status	Req States
09577 A	S-METOLACHLOR/METOLACHLOR (DREXEL SIPCAM SYNGEN)	SPINACH (04A = LEAFY GREENS SUBGROUP)	FINAL REPORT COMPLETED & READY FOR SUBMISSION	MRID: EPA Status: PEND:11/09	NY MD CA AZ

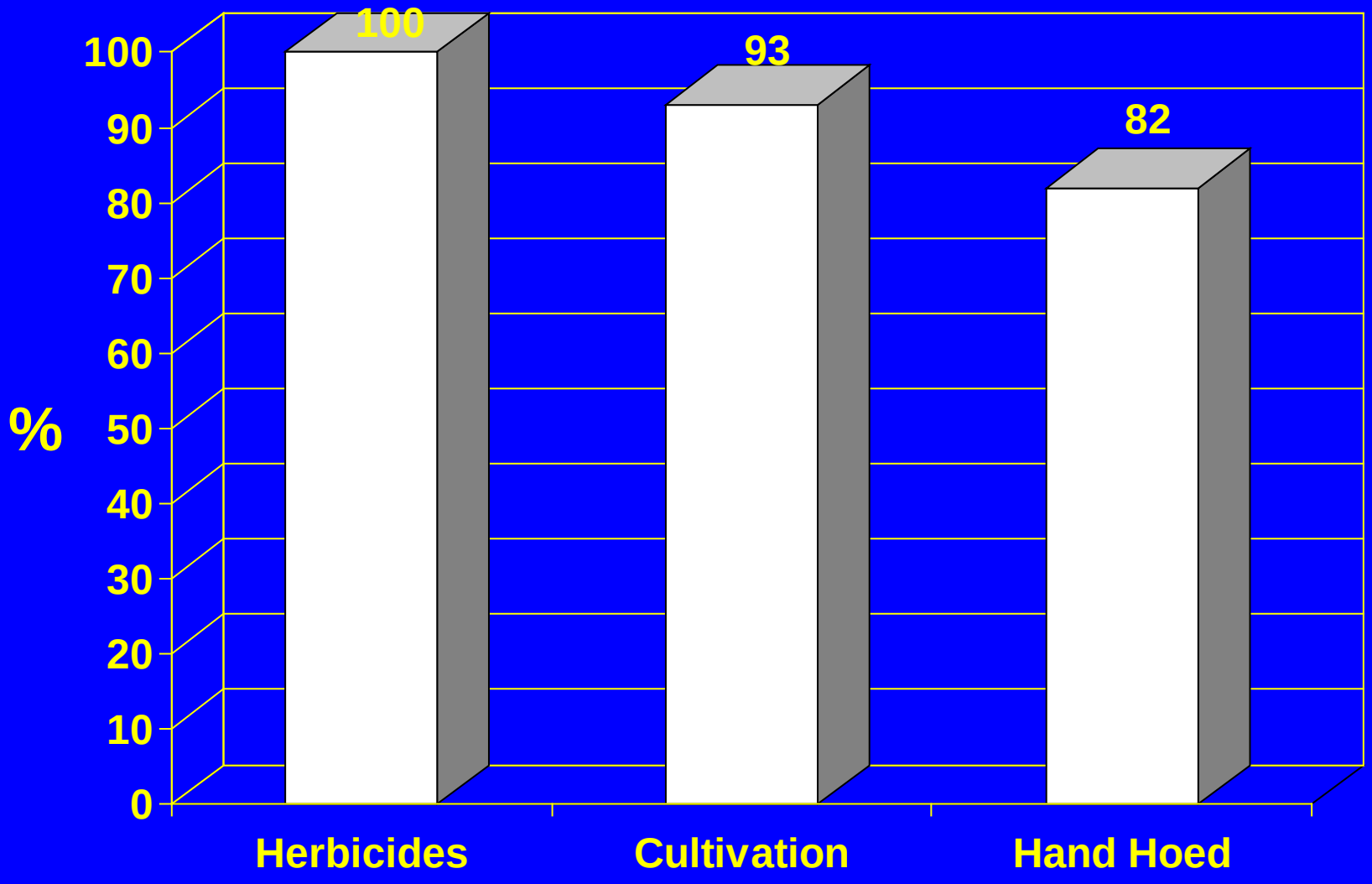
EPA PRIA:
Reasons for need: BROADLEAF WEEDS
Residue Data Sites:
Performance Data Required:
Use Pattern:

PCR: 0.24-0.94 LB AI/A; PRE-EMERGENT SURFACE BROADCAST APPLIC; APPLY AFTER PLANTING & PRIOR TO WEED GERMINATION; USE AT LEAST 15 GPA; DO NOT INCORPORATE
Protocol: 0.65 AND 1.02 LB.AI/A; APPLY EACH RATE IN 10-40 GPA, SINGLE APPLIC, BROADCAST PRE-EMERGENCE AFTER PLANTING BUT PRIOR TO CROP EMERGENCE (20-DAY PHI); ALSO 0.65 LB.AI/A, APPLIED TWICE-FIRST APPLIC AS PRE-EMERGENCE BROADCAST SPRAY AFTER PLANTING BUT PRIOR TO CROP EMERGENCE; SECOND APPLIC IS POST-EMERGENCE, BROADCAST, FOLIAR AT 20 DAY BEFORE HARVEST
Label to EPA:

Comments: REQUEST TO REDUCE THE PREHARVEST INTERVAL FROM 40 DAYS (PR# 6336) TO 20 DAYS; FUTURE SUBMISSION FOR SPINACH (9577) , CANTALOUPE (9406), CILANTRO (9595) ALSO INCLUDE LEAF LETTUCE (10099) & BEET GREENS (7486)
State Requestor: NY :Bellinder, R. MD :Beste, E. CA :Fennimore, S. AZ :Tickes, B.

Lettuce Weed Control

Yuma County Arizona 2009



Non-chemical Weed Control

Exclusion

Hand Labor

Mechanical

Solarization

Cultural


Prevention
205

Labor

PHOTO BY CRAIG FRY/YUMA SUN

Matt McGuire (left), national account executive with C-SPAN, and Vanessa Bailey (standing), C-SPAN marketing representative, visit with staff members of the Foothills Branch Library Thursday.

Read more about the bus and its journey/A3

Lobbyists fight to keep payday lending legal

Law permitting niche industry set to expire June 30

BY HOWARD FISCHER
CAPITOL MEDIA SERVICES

PHOENIX — Rejected by voters and stymied in the House, lobbyists for payday lenders are now trying to get a Senate panel to approve legislation to keep the industry alive beyond June 30.

But now there's a sweetener: They're offering to set aside an estimated $1.5 million of their proceeds each year for community-based organizations that help the needy.

That still may not be enough to corral the votes they need to keep the doors open. Most Democrats and several Republicans already have announced their opposition to extending the life of a special law that allows lenders to charge what would be the equivalent of 400 percent interest on an annual basis.

Gov. Jan Brewer, facing a tough re-election campaign, has not taken a position on the bill. But press aide Paul Senseman said Brewer voted against the 2008 lender-sponsored initiative to keep payday lending legal, a measure that went down to defeat by a 3-2 margin despite $14.7 million in industry spending.

With the law allowing payday lending set to expire June 30, that leaves legislation as their only remaining option.

House Majority Whip Andy Tobin, R-Paulden, sponsor the necessary legislation.

But Tobin pulled the plug when it became clear that not a single Democrat on the panel would support it. Tobin said he did not want the issue of

SEE LENDING/A6

BLM seeks volunteers needed to help pull weeds

BY JAMES GILBERT
SUN STAFF WRITER

If you enjoy doing yardwork, then the Bureau of Land Management's Yuma Field Office could use your help.

BLM spokeswoman Lori Cook said the agency is inviting the public to come help agency staff pull some weeds from 9:30 to 11:30 a.m. Sunday.

Cook said staff and volunteers will be pulling up weeds known as Brassica tourefortii from an area in the Foothills that is overgrown with the plants.

"Every plant that gets pulled means there will be fewer seeds getting out to grow more plants. The site we will be at will be an ongoing problem for us for many years."

> "Every plant that gets pulled means there will be fewer seeds getting out to grow more plants."
>
> — Lori Cook, BLM spokeswoman

Brassica is a nonnative mustard plant from North Africa and Central Asia, Cook said, and it typically occurs in disturbed areas such as dry washes and roadsides.

The weed often infests new areas when its sticky seeds adhere to the undercarriages of all types of vehicles, including construction vehicles and off-road vehicles.

Cook said since Brassica outcompetes native plant growth for sunlight and water because biological controls do not exist in North America, Brassica lowers native plant diversity and degrades wildlife habitat.

"Brassica grows between March and May, so this is the perfect time for us to be out there pulling them."

All volunteers are asked to meet BLM specialists where the dirt road starts at the end of Foothills Boulevard north of Interstate 8.

To get to the location from Yuma, take Interstate 8 east about 10 miles to Foothills Boulevard. Turn north on Foothills Boulevard

SEE WEEDS/A6

big impact and it's a
concern to them. In Yu
three positions are fun
with that money, he sai

"We have no where
go right now. The gen
fund for the county is
but they don't have mo
available to absorb that.

Under the plan, Ariz
State Parks would
authorized to use
money in the Law Enfo
ment Boating and Saf
Fund to operate st
parks. The agency plans
close 13 parks and k
nine open due to bud
cuts.

The Yuma Territo
Prison is one of the 13
state will stop funding.
Yuma Crossing Nati
Heritage Area will
over after the state
out of its lease at the e
the month.

According to the
Legislative Budget
mittee, the fund cur
contains $2 million
used to employ 26 b
officers throughou
state.

Capt. Eben Bra
spokesman for the
County Sheriff's
said losing Yuma C
officers assigned
watch on boaters
leave his departme
ing to rather than
ing reckless behav

"The Colorado
very popular
pretty rowdy,
we are no
officers to patr
going to make it
dangerous out th

40071500

1850-1882

Chinese Era

1890’s – 1900’s

Japanese Era

1920’s – present

Mexican Era

Tuesday, Jan. 4

ARIZONA
Fantasy Five - 24,34,18,25,3
Pick 3 - 0,2,6

CALIFORNIA
Fantasy Five - 12,20,22,32,38
Afternoon Daily 3 - 3,6,7
Evening Daily 3 - 1,2,2

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PHOTO BY JACOB LOPEZ/THE SUN

A TUNNEL carved out of a truckload of hay covered a number of aliens that U.S. Border Patrol agents apprehended late Monday night at the Interstate 8 checkpoint near Telegraph Pass. Inside this tunnel, carpet is laid out on the hay, and thick plywood supports it from above. There were a number of other hidden holes and tunnels in two truckloads found by the U.S. Border Patrol on Monday. Oranges and other miscellaneous items were found in the hay.

Agents find illegal aliens inside hay

BY JONATHAN ATHENS
SUN STAFF WRITER

U.S. Border Patrol agents on Monday arrested 46 illegal immigrants hiding within secret compartments inside hay bales on two tractor-trailers.

The arrests, which took place within a 20-hour span at a Border Patrol checkpoint along Interstate 8, is the first significant one of the new year and had all the markings of "a large-scale, organized, commercial human smuggling operation," said Joe Brigman, spokesman for the Border Patrol's Yuma sector.

All of the illegal immigrants admitted they each paid approximately $2,000 to be smuggled to various locations throughout the United States, Brigman said.

The drivers of the trucks, both Mexican men legally residing in the United States, have each been charged with felony smuggling, Brigman said.

The illegal immigrants were hiding inside makeshift plywood compartments within the bales of hay and were discovered when Border Patrol canines detected human scent, he said.

"This is the length that they're going to try to transport these people away from Yuma," Brigman said, adding the case is under investigation.

PHOTO BY JACOB LOPEZ/THE SUN

TWO TRUCKLOADS of hay sit at the U.S. Border Patrol Yuma sector headquarters Tuesday morning after agents apprehended a number of aliens at the Telegraph Pass checkpoint on Interstate 8 the day before.

drugs were found among the illegal immigrants arrested.

More than 90,000 arrests were made in the Yuma sector in 2004 alone. "There are no indications the number of arrests will decline" this year, Brigman said.

Jonathan Athens can be reached at

AN ILLEGAL ALIEN is seen inside a hidden area of a truckload of hay Monday morning about 3 a.m. after Border Patrol agents apprehended 20 aliens in this load at the Interstate 8 checkpoint near Telegraph Pass. Also, 26 other aliens were apprehended in another truckload of hay at 11:30 p.m. Monday.

Two arraigne
connection w
shooting inci

FROM STAFF REPOR

Two Yuma me
arraigned in Yuma
Court on Tuesday in c
with a shooting incide
Year's Day.

Ismael Pena, 21, wa
with unlawful discha
firearm by Justice of
pro tem David Cooper.

Saturday, Yuma Co
iff's deputies responde
to several calls of gu
the vicinity of the 60
South Avenue C. Depu
contact with Pena, w
shooting a gun.

Pena allegedly w
with a .22-caliber han
gally concealed on h
Deputies also said th
several .22-caliber
caliber casings lying o
residence. Pena then a
firing the gun, deputie

A search warr
obtained for the resi
deputies found a
handgun under the m
the bedroom of Davi
22, according to th
County Sheriff's Office
tivated marijuana p
items of drug para

Cultivation


Vision Guided In-row
Cultivation
Tillett and Hague Technology Ltd


ROBOVATOR

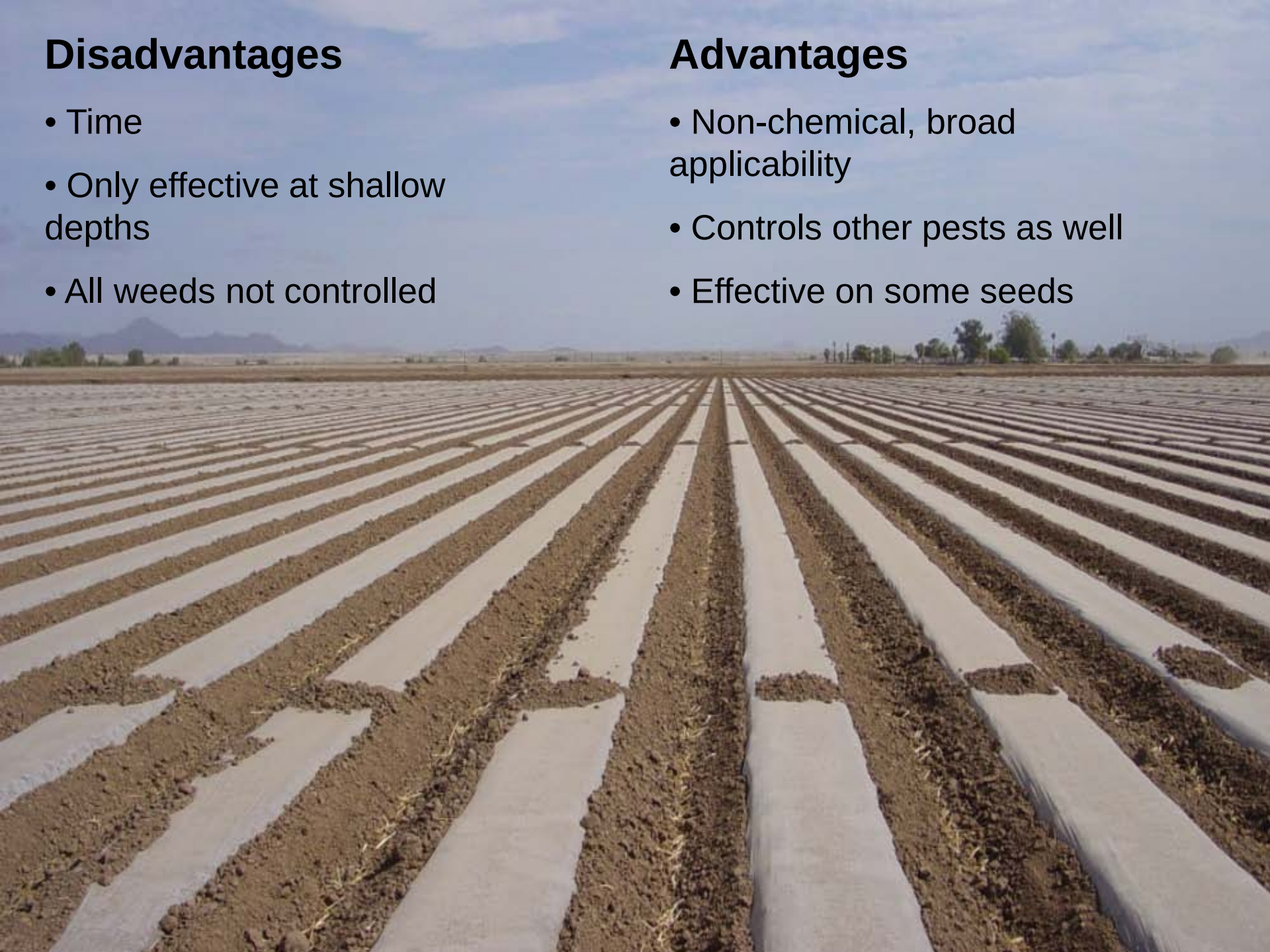
Cultivation

- **Advantages**
- Roots,shoots and above ground portions of the weeds are destroyed and buried.
- Surface crusts are broken up,aeration and water penetration is improved.
- Other pests may be controlled

- **Disadvantages**
- Perennial weeds can be dispersed.
- Weed seed brought to the surface.
- Moisture loss and soil erosion
- Crop roots damaged

Soil Solarization

- Clear polyethylene
- 4-6 weeks
- Moisture



Disadvantages

- Time
- Only effective at shallow depths
- All weeds not controlled

Advantages

- Non-chemical, broad applicability
- Controls other pests as well
- Effective on some seeds

2005 field soil solarization trial

2005 field soil solarization trial

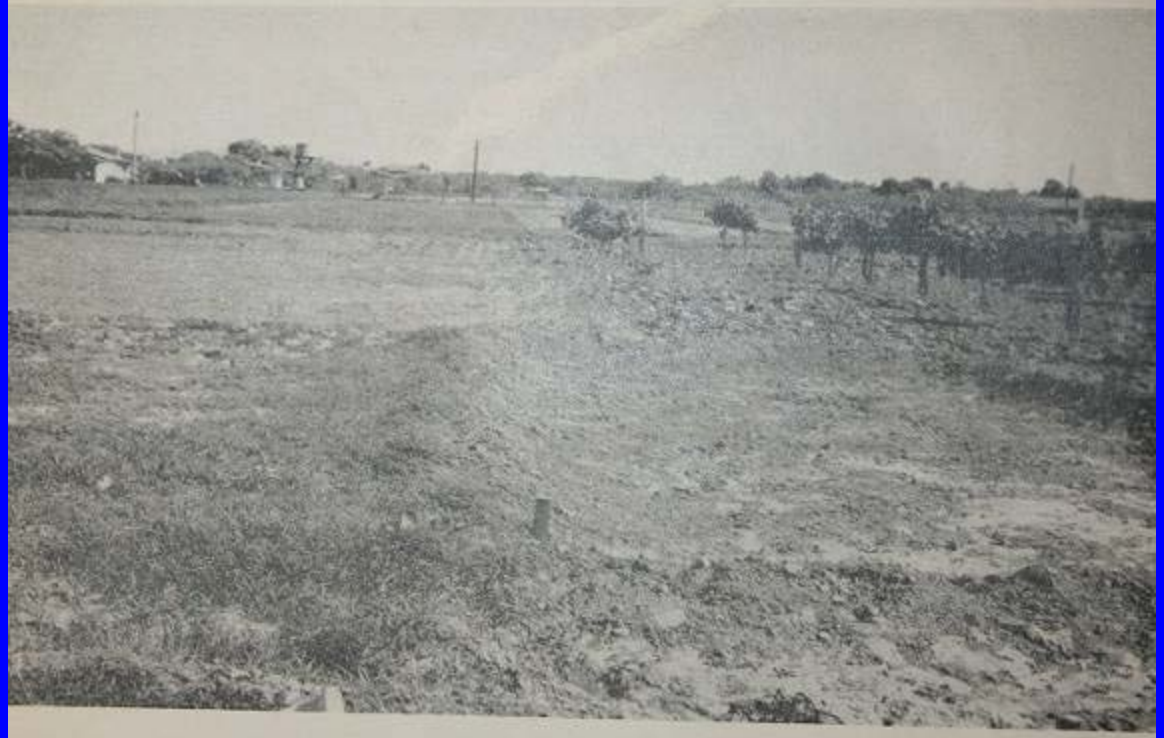
Fusarium wilt at crop maturity

Cultural Control Methods

- Crop Rotation
- Mulch Planting
- Preplant Germination of weeds
- Water Management
- Planting Pattern
- Fallow
- Stale Seedbed
- Planting Time
- Variety Selection
- Smother Crops
- Competitive Crops
- Grazing
- Biological Control (insects)
- Biological Control (Diseases)
- Allelopathy
- Flooding
- Weed Free Seed
- Weed Laws
- Row Spacing
- Crop Population
- Clean Borders and Edges
- Timely Crop Destruction
- Land Selection
- Planting Date
- Reduced Tillage
- Natural Enemies

Bulletin 189 March, 1943

ERADICATION AND CONTROL OF NUT GRASS



Agricultural Experiment Station
University of Arizona, Tucson

Traditional Breeding

- STS - SU tolerant soybeans
- Poast Protected Field Corn
- Clearfield (Imi resistant) corn wheat, canola, sunflower, rice

Genetic Engineering (GMO's)

- Glyphosate resistant crops
- Glufonsinate (Liberty-Link) resistant
- BXN (Bromoxynil) resistant

Conclusions

- Because of the costs to develop and register pesticides, the development of new herbicides for vegetables is unlikely.
- Reliance on cheap labor has always put vegetable growers in a precarious position.
- Non-chemical cultural practices, automated cultivation equipment and old herbicides will likely continue to be relied upon.
- With the help of the IR4 Project the industry will remain competitive.. **THANK YOU**

Extra Slides

Family*: Brassica/Crucifer*

Crops: Bok Choy, Napa, Mizuna, Kale, Kohlrabi, Turnip Greens, Mustard, Tatsoi, Arugula, Radish, Daikon

Herbicides	Year First Registered
Prefar	1962
Trifluralin	1967
Dacthal	1970
Stinger	1987
Poast	1984
Select	1991

Family*: Umbelliferae*

Crops: Cilantro, Coriander, Parsley, Dill, Parsnip, Fennel

Herbicides	Year First Registered
Prefar	1962
Lorox	1965
Poast	1984

Family*: Aster*

Crops: Endive, Escarole, Chicory, Radicchio

Herbicides	Year First Registered
Prefar	1962
Trifluralin	1967
Kerb	1969
Fusilade	1984
Poast	1984
Select	1991

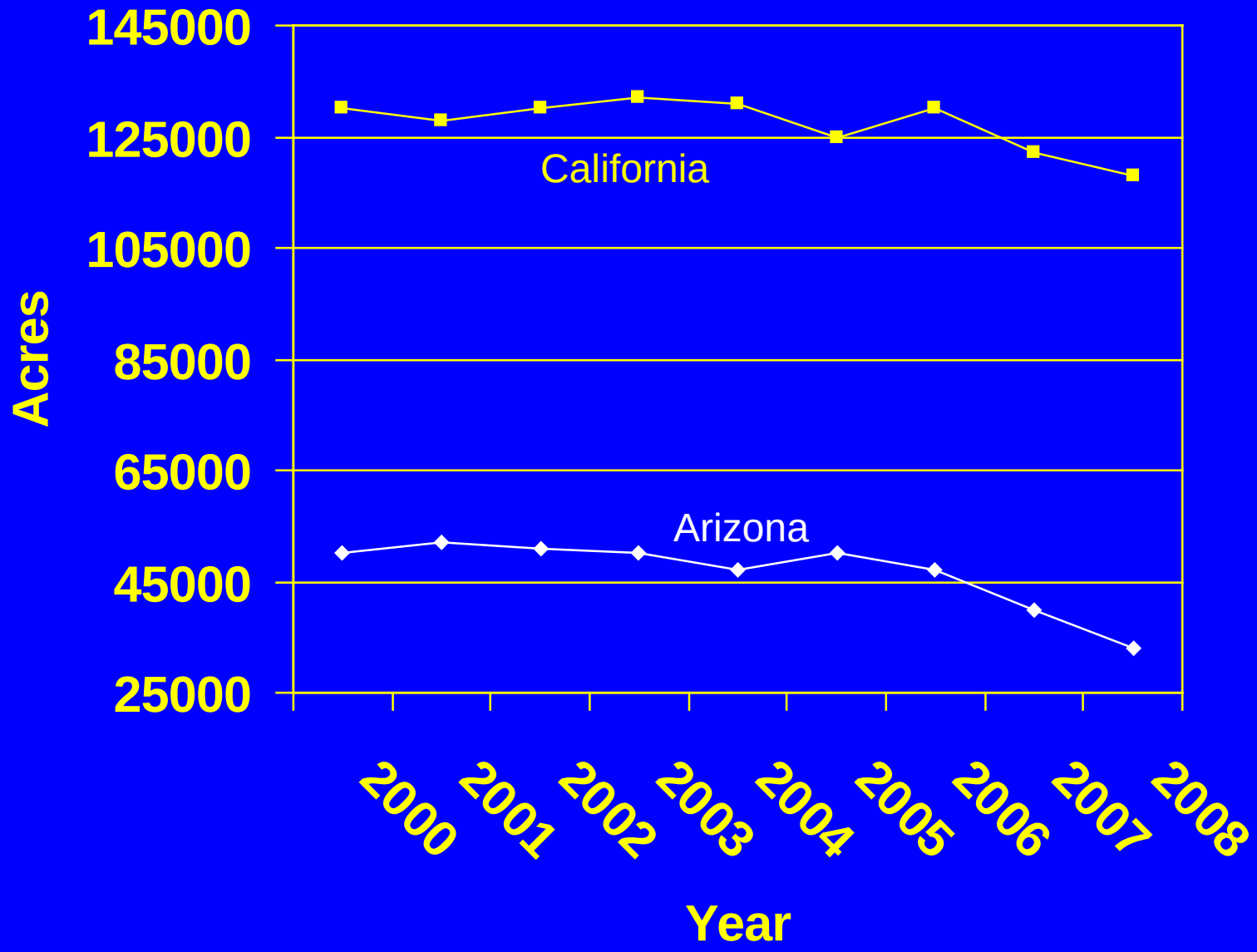
Family*: Amaranth*

Crops: Spinach, Chard, Beets

Herbicides	Year First Registered
Roneet	1987
Dual Magnum (AZ. Only)	1977
Poast	1984
Select	1991

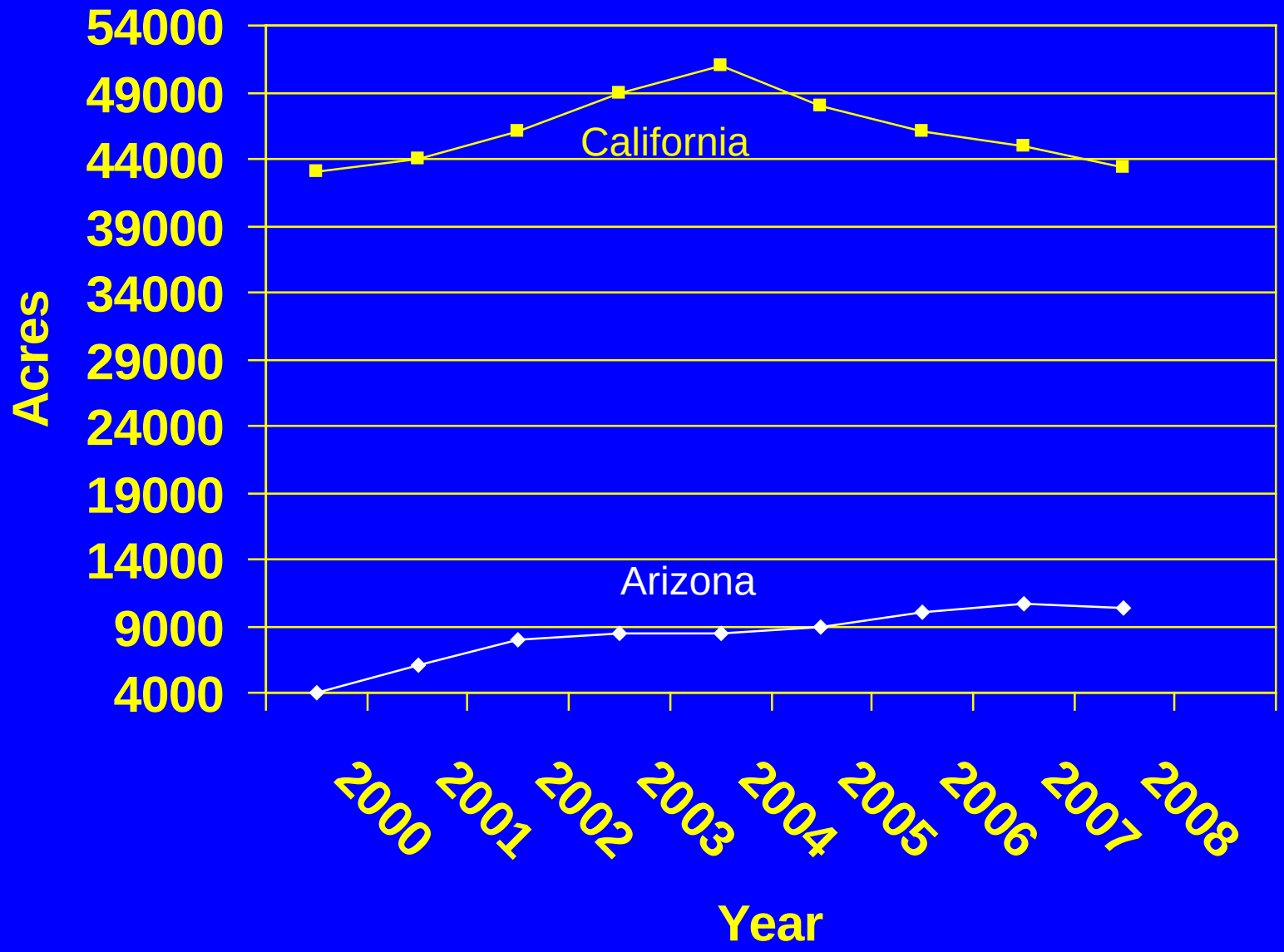
Head Lettuce

Arizona - California



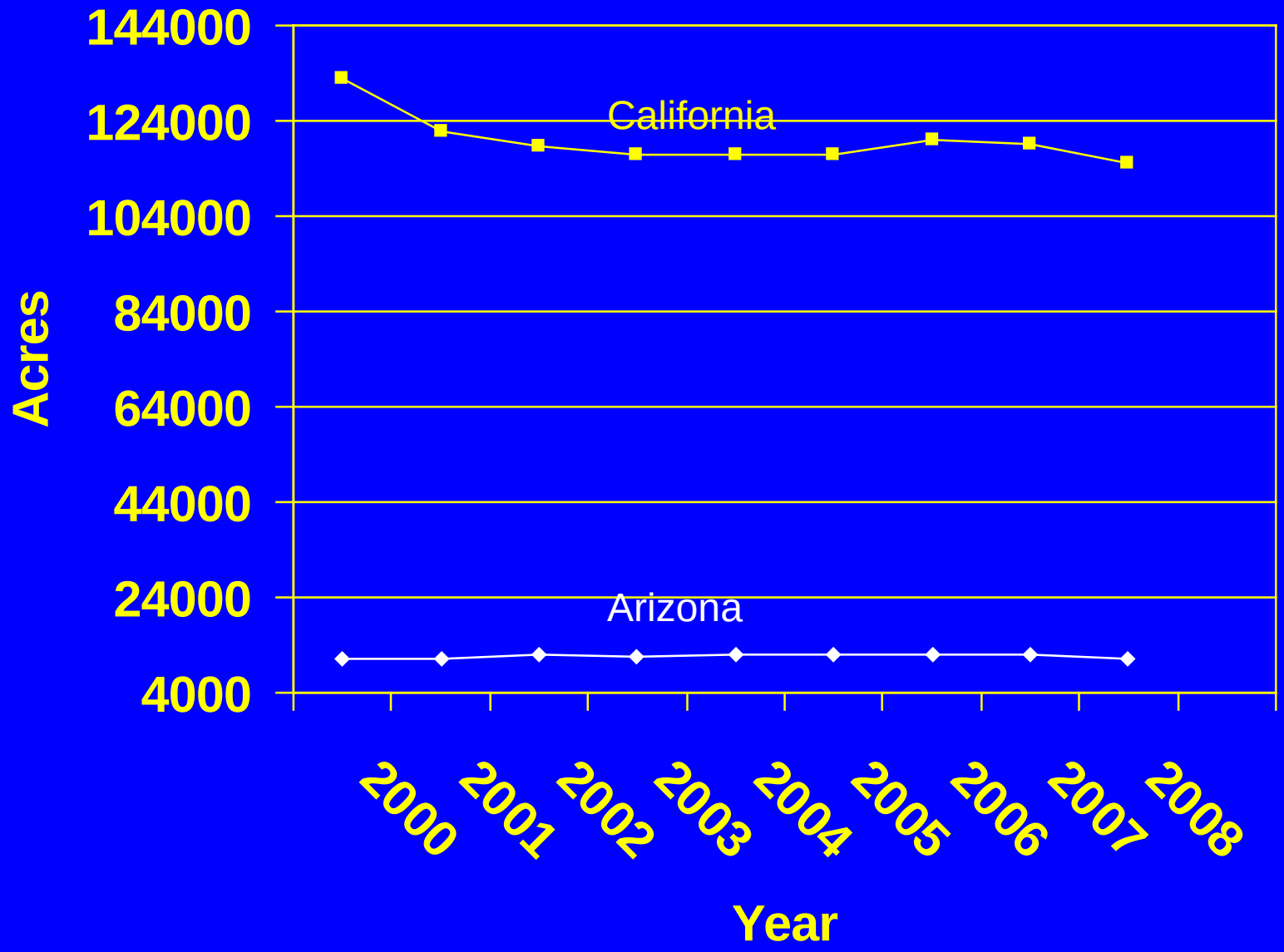
Leaf Lettuce

Arizona - California



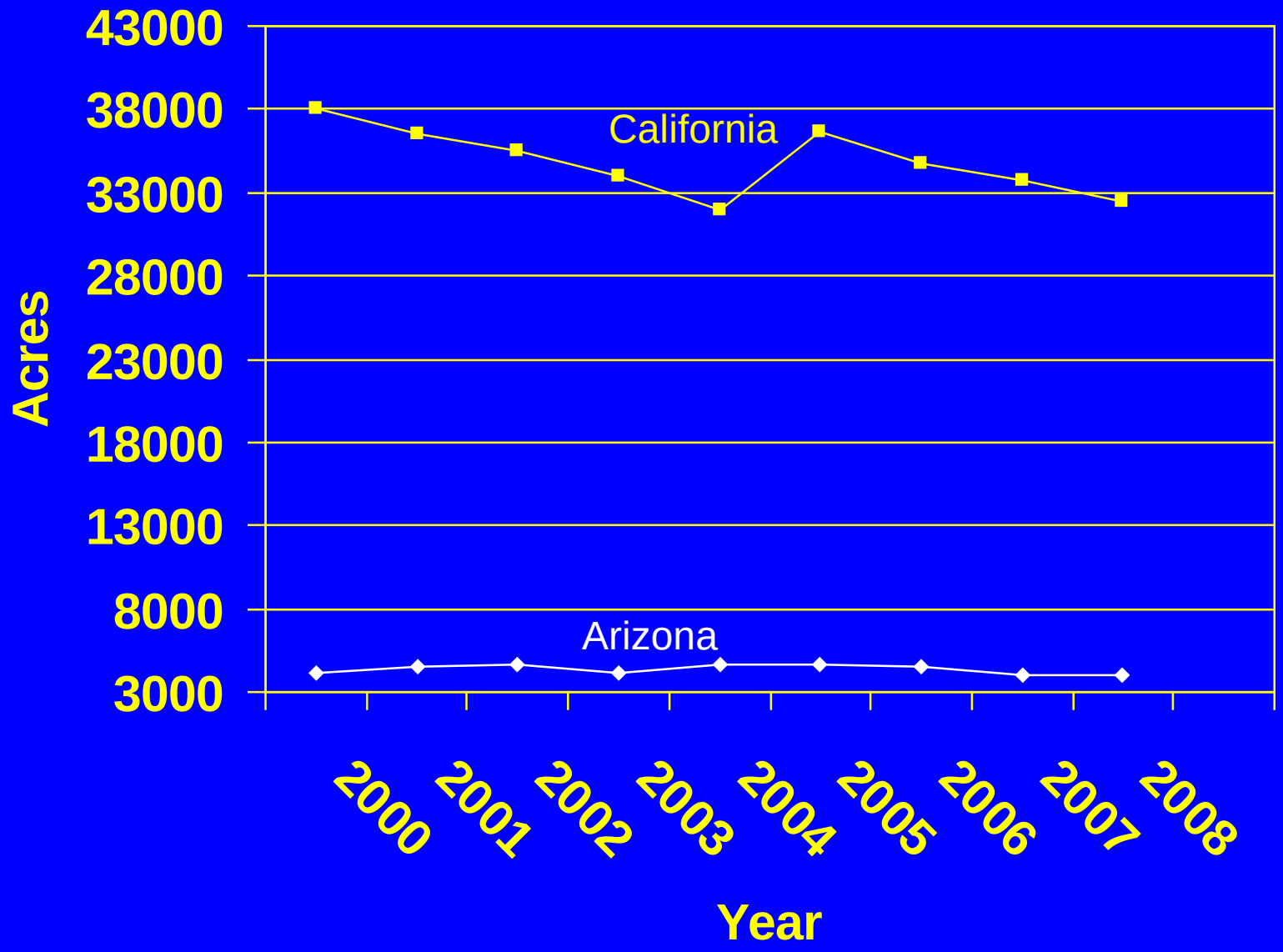
Broccoli

Arizona - California



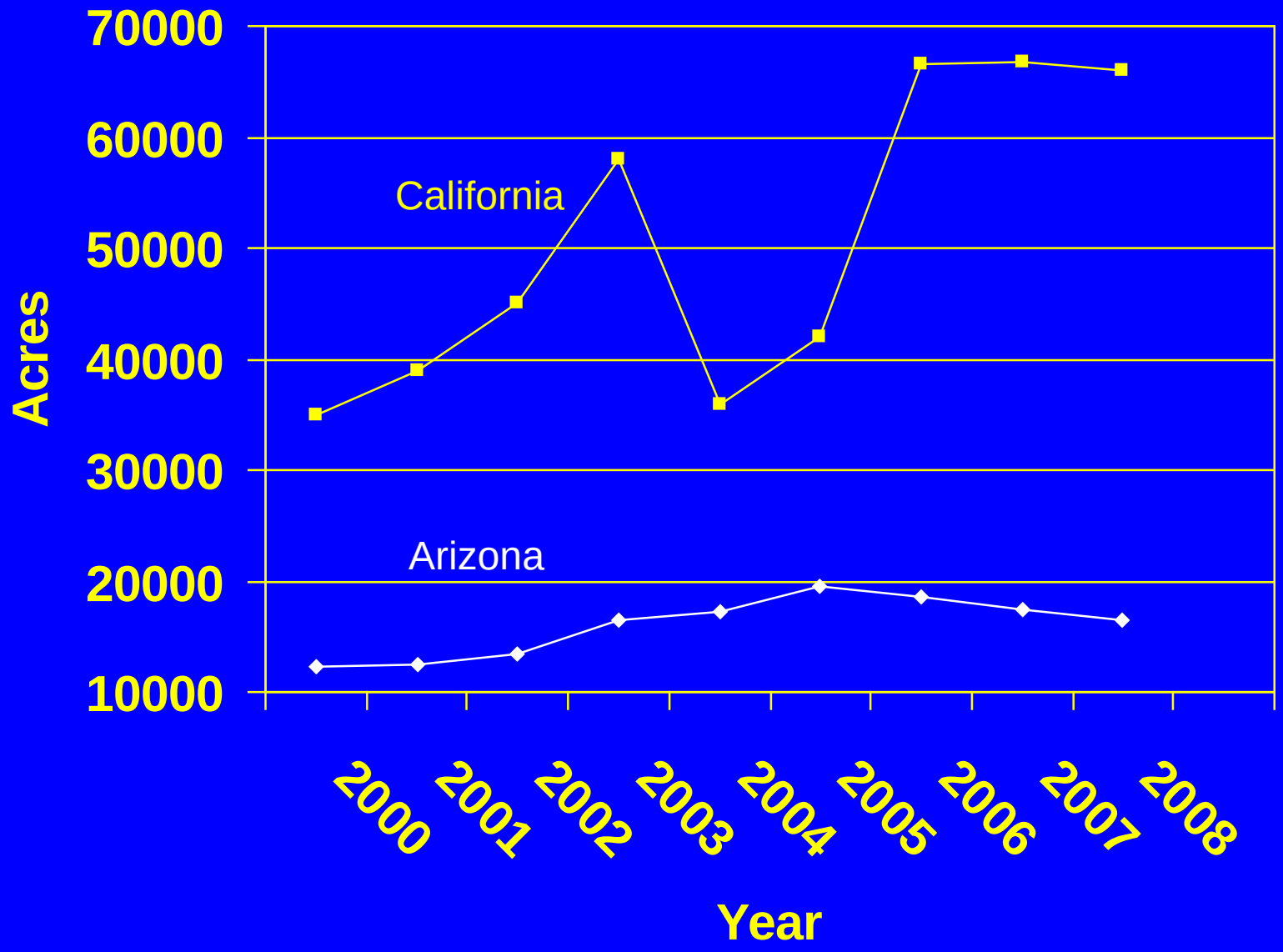
Cauliflower

Arizona - California



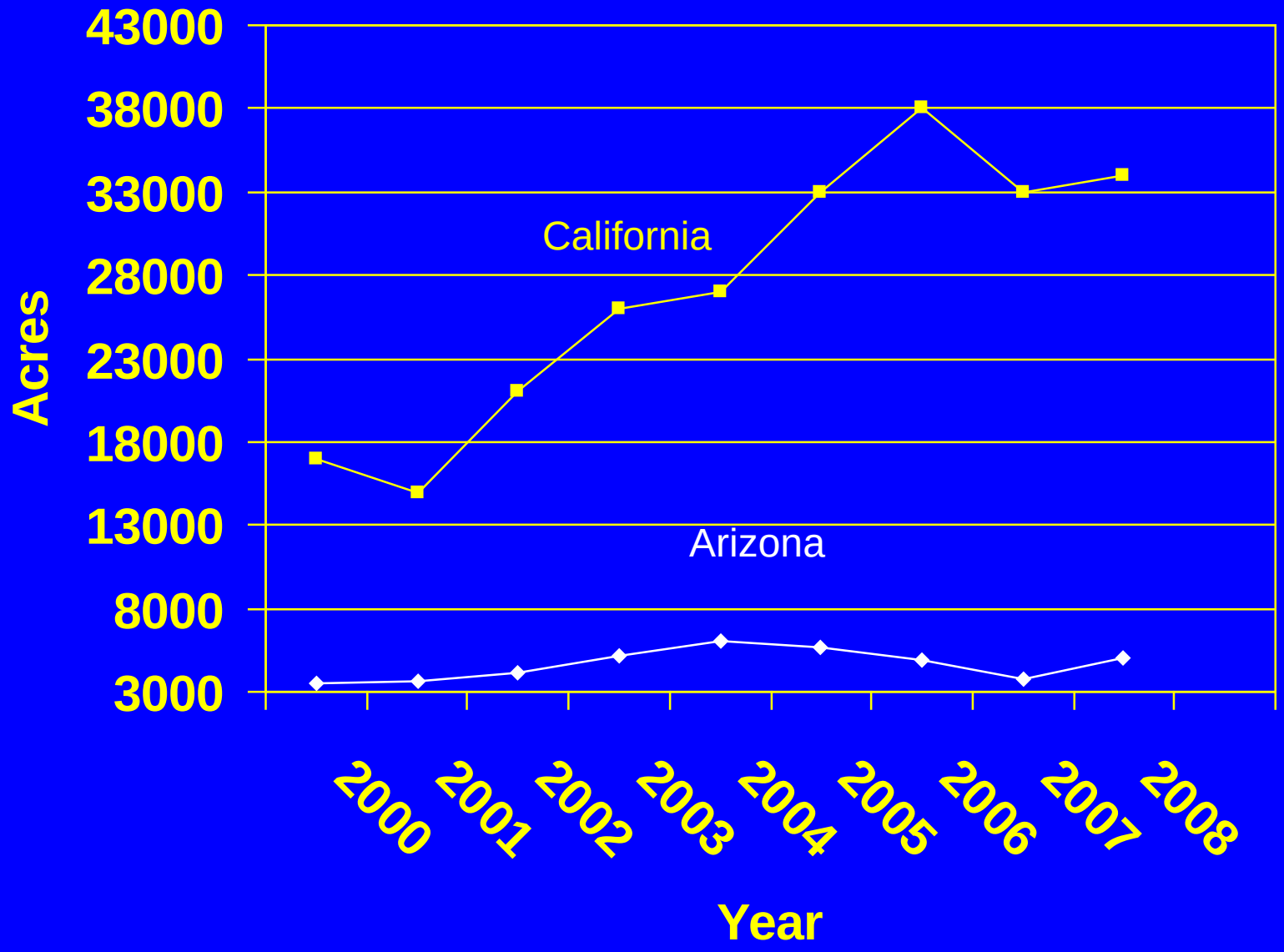
Romaine

Arizona - California



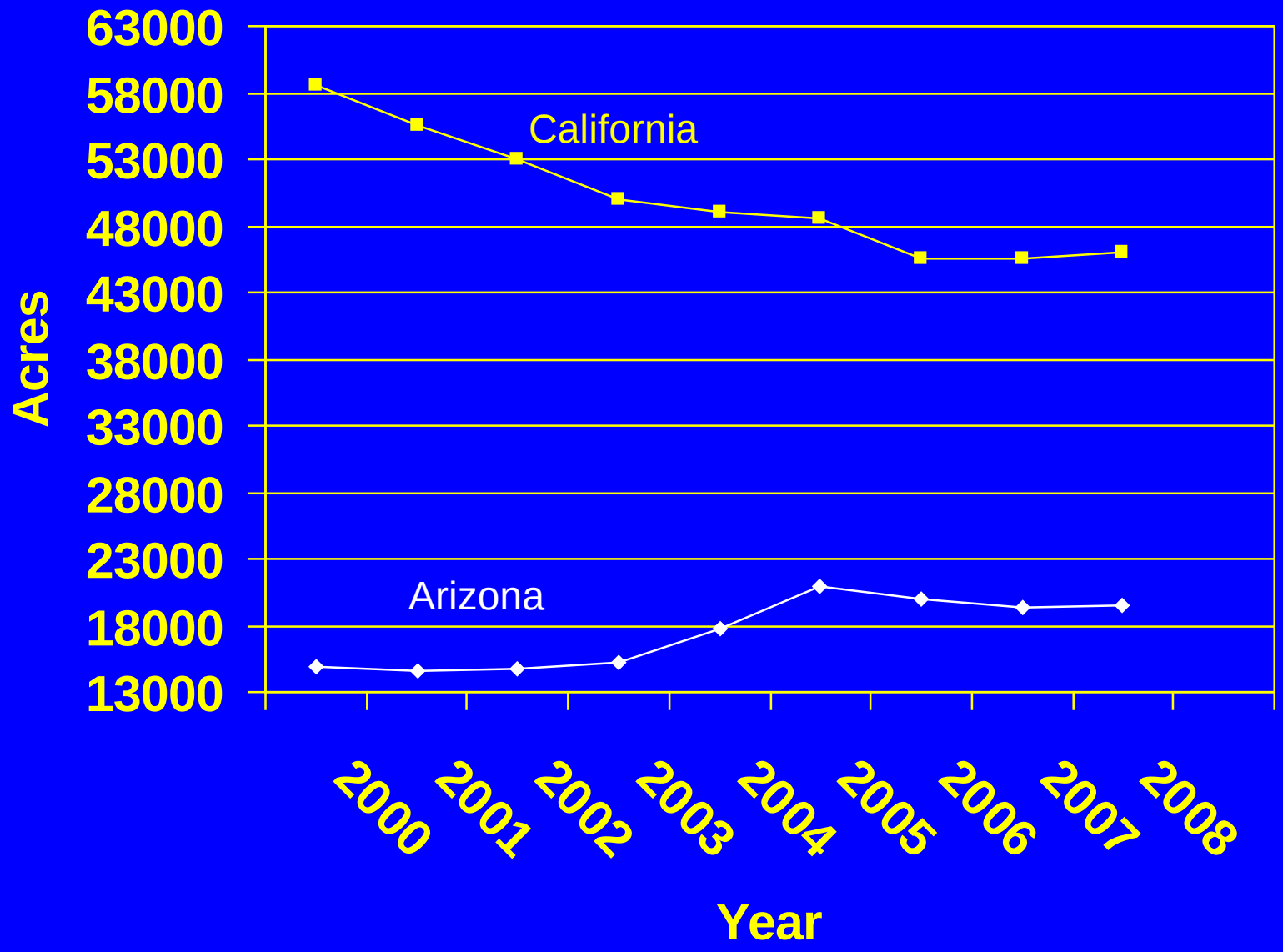
Spinach

Arizona - California



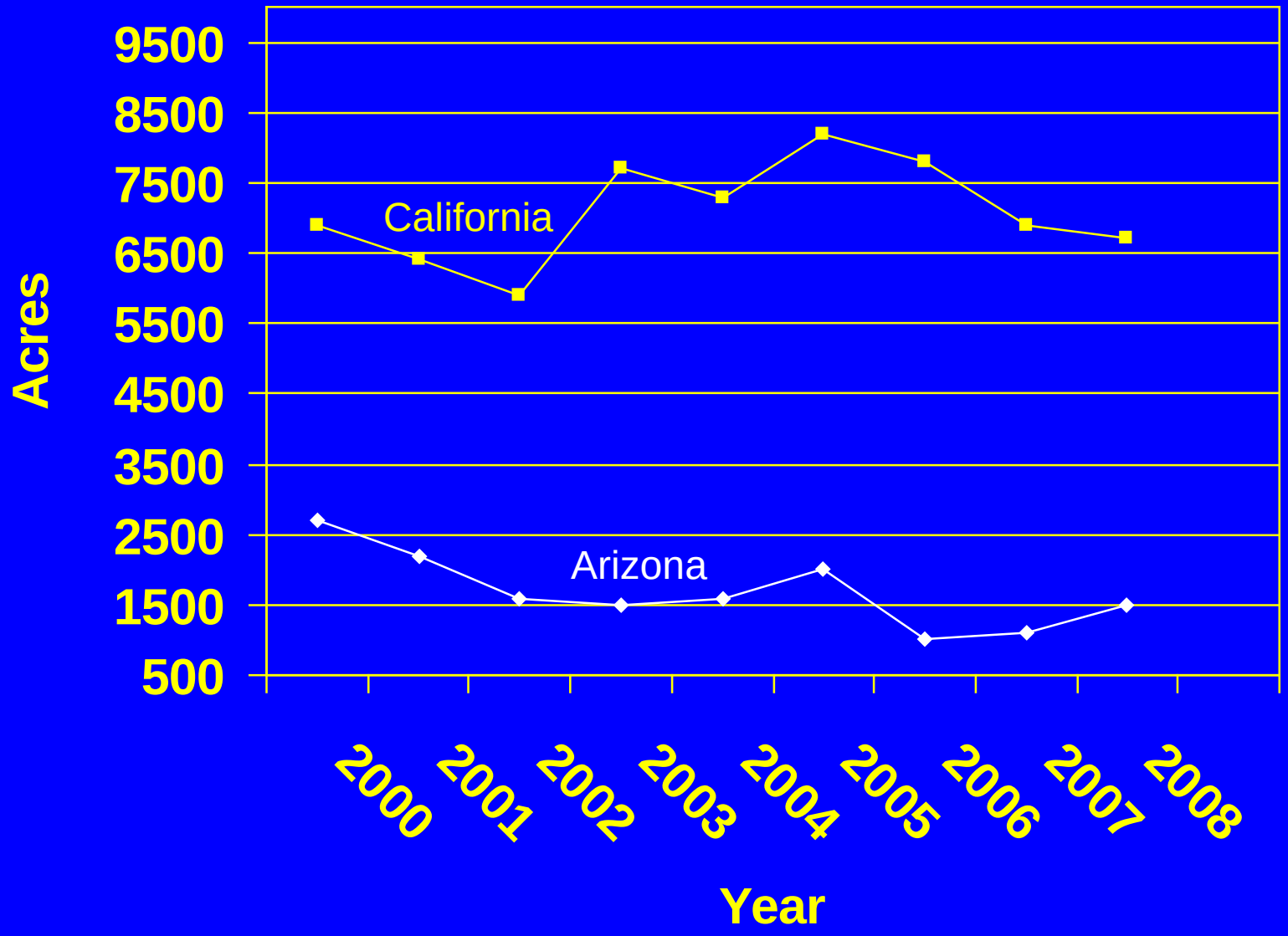
Cantaloupe

Arizona - California



Onions (Spring)

Arizona - California



$186/ac.

Untreated: 2007

$138/ac.

Untreated: 2008

$12/ac.

Dacthal 14pts.: 2007

$16/ac.

Dacthal 14pts.: 2008

$15/ac.

Prefar 6qts.+ GoalTender 6oz.: 2007

$18/ac.

Prefar 6qts. + GoalTender 6oz.:2008

2008 New Tolerances (246)

- 125 Fungicides
- 89 Insecticides
- 32 Herbicides (8 veg.)