

WEED RESISTANCE: A 60-YEAR PERSPECTIVE

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An old broken down weed scientist

Some Things I believe

(based on 60 years of fighting weeds!!)

- ▣ Herbicide-resistant weeds: a game-changer for agriculture
- ▣ Particular concern about resistance to multiple classes of chemistry and metabolic resistance
- ▣ We have become complacent in our approach to weed management
- ▣ We must become better managers
- ▣ And, we will continue to need new technology

Where has our Focus Been Since the 1950s

- ▣ Main Focus has been on killing weeds (Control)
 - Weed control is chemically based - technology
 - ▣ Good reason for that
 - ▣ Efficiency, economics, etc.
 - ▣ Nothing else comes close for weed control
 - ▣ People left the farm in mass – farming was a hard life
 - ▣ Hand weeding is drudgery
 - Includes plowing with a mule
 - Life is simpler when you plow around the stumps

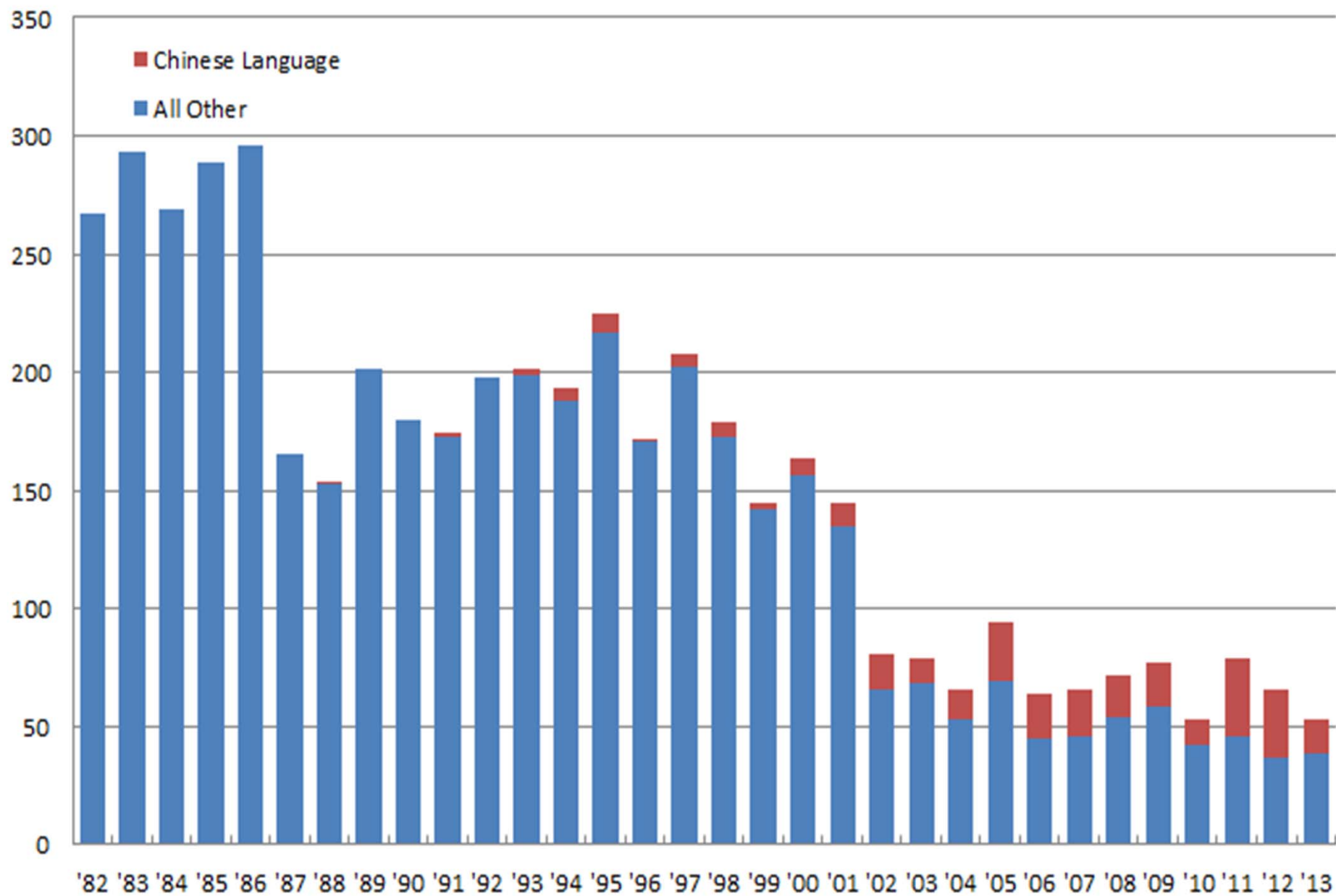
Weed Control Technology Expansion 1960 - 1995

- New chemical technologies allowed:
 - More acres per grower
 - Less time and labor involved in weed control
 - Economic incentives
 - Simplification of weed control
 - Much improved weed control

Weed Control Technology Expansion Post 1995

- ▣ Mostly about genetic engineering
- ▣ One chemical controls all weeds (mostly)
- ▣ Most of industry “gave up” on new chemistry
- ▣ 1975 – 30 companies involved in development
- ▣ 1999 – 6 companies remain

Herbicide New A.I. Patents 1982-2010



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- ▣ It is NOT the fault of the technology
 - Overreliance on ANY technology is risky
 - Maybe the technology was too good?
 - Humans are inclined to look for simple solutions
 - The Pogo analogy
 - ▣ “We have met the enemy and he is us”
 - The “Tragedy of the Commons”
 - ▣ Use of common pool resources

Lack of Focus on Management

- ▣ Need more focus on weed management
 - Weed management is multi-strategy
 - ▣ Prevention
 - ▣ Avoidance
 - ▣ Monitoring
 - ▣ Suppression
 - Utilization of BMPs
 - Still need new technology
 - ▣ Not just chemicals

Some Things I believe

- ▣ Assume all fields have resistance
 - Resistance genes are present
 - May not have manifested in a weed yet
 - May not have been selected for yet
 - But it will happen without proper management
 - Cannot manage something you do not have –
 - ▣ But, you can manage to not have it!!!

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- ▣ Resistance is an area wide issue
 - Neighbor effect

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- ▣ Industry incentives
 - Tie rebate programs to BMP use?

So, Could we have Avoided Resistance?

- ▣ Probably not – it was in the populations – we just selected for it.

Could we have Managed it Better?

- ▣ Absolutely – by paying more attention to what was happening post treatment and following up to clean up escapes

So, Where are we Headed?

- ▣ It depends...

If we do not get smarter.....



So, What is Smarter?

- ▣ Learn from past mistakes
 - Cannot do same thing all the time in all fields
- ▣ Increase diversity of weed management tactics
- ▣ More critical observation of tactic outcomes
- ▣ All segments tell the same story
- ▣ Transparent product information
- ▣ Understand there is no “silver bullet”
- ▣ Translate impacts into \$\$\$\$\$