Increasing Diversity of Insecticide Active Ingredients and Problems with the Availability and Quality of Data

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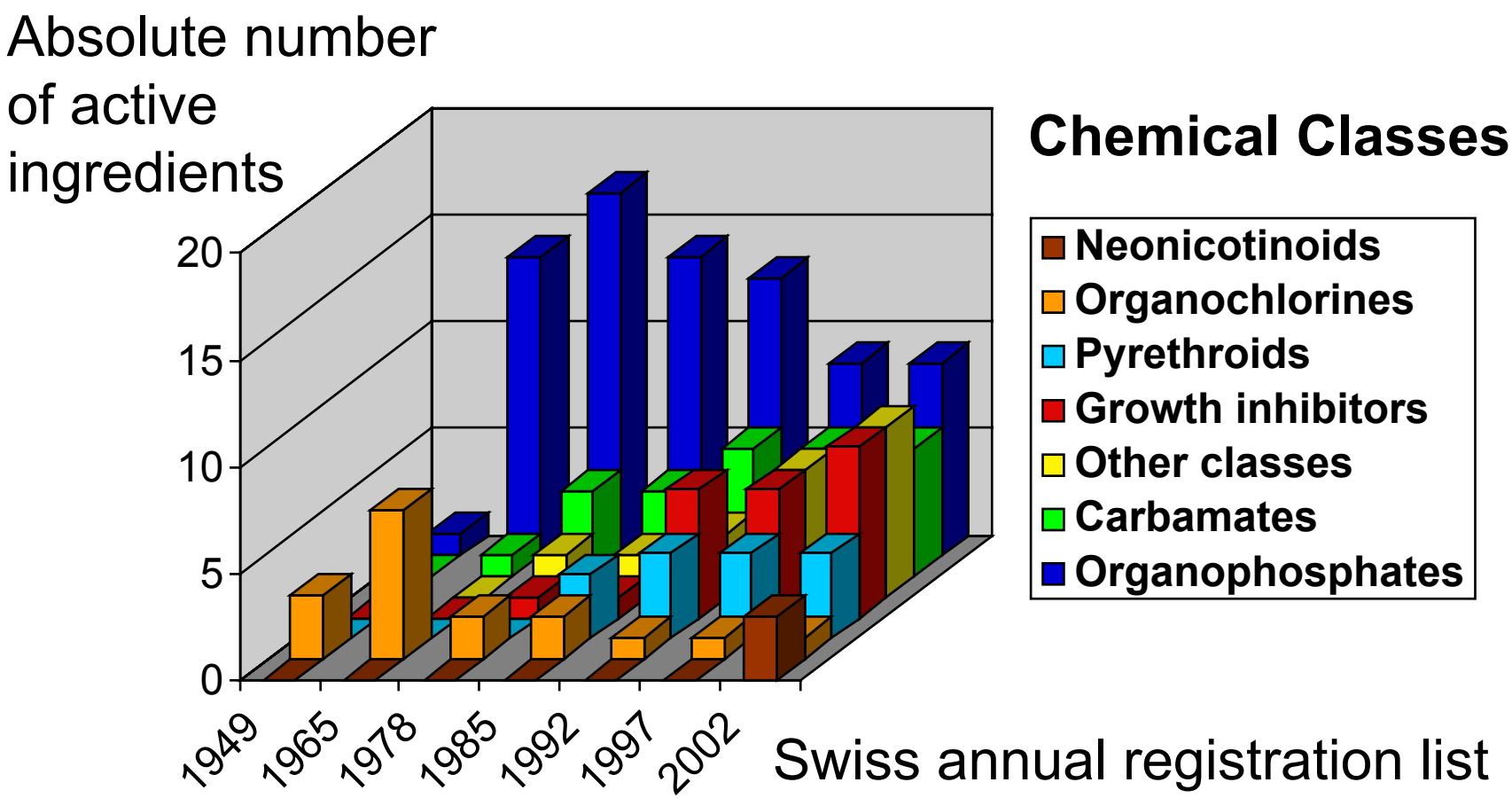
Overview

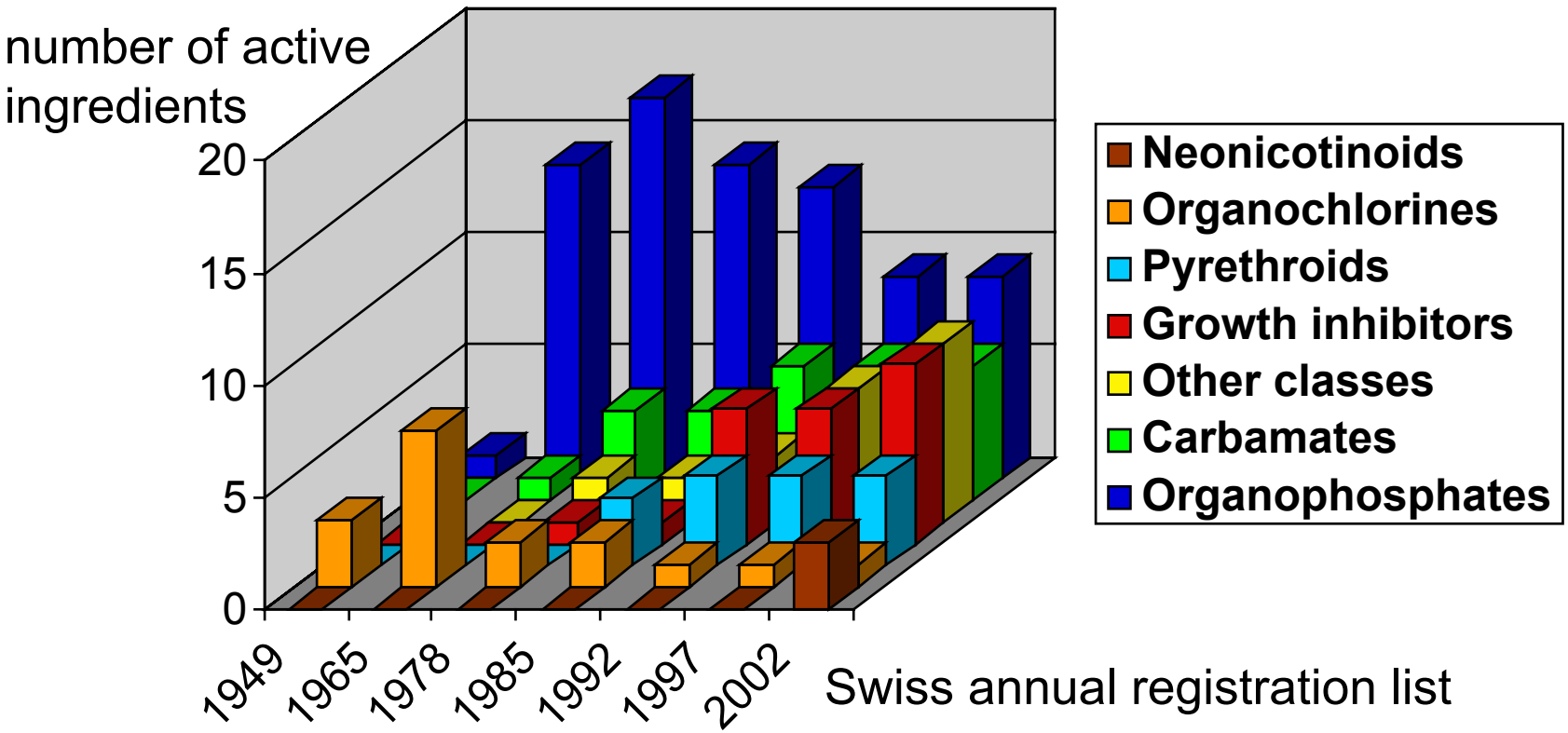
- Growing number of active ingredients and chemical classes
- Changes in properties of the pure substances
- Sources and variability of data

Development of Chemical Classes



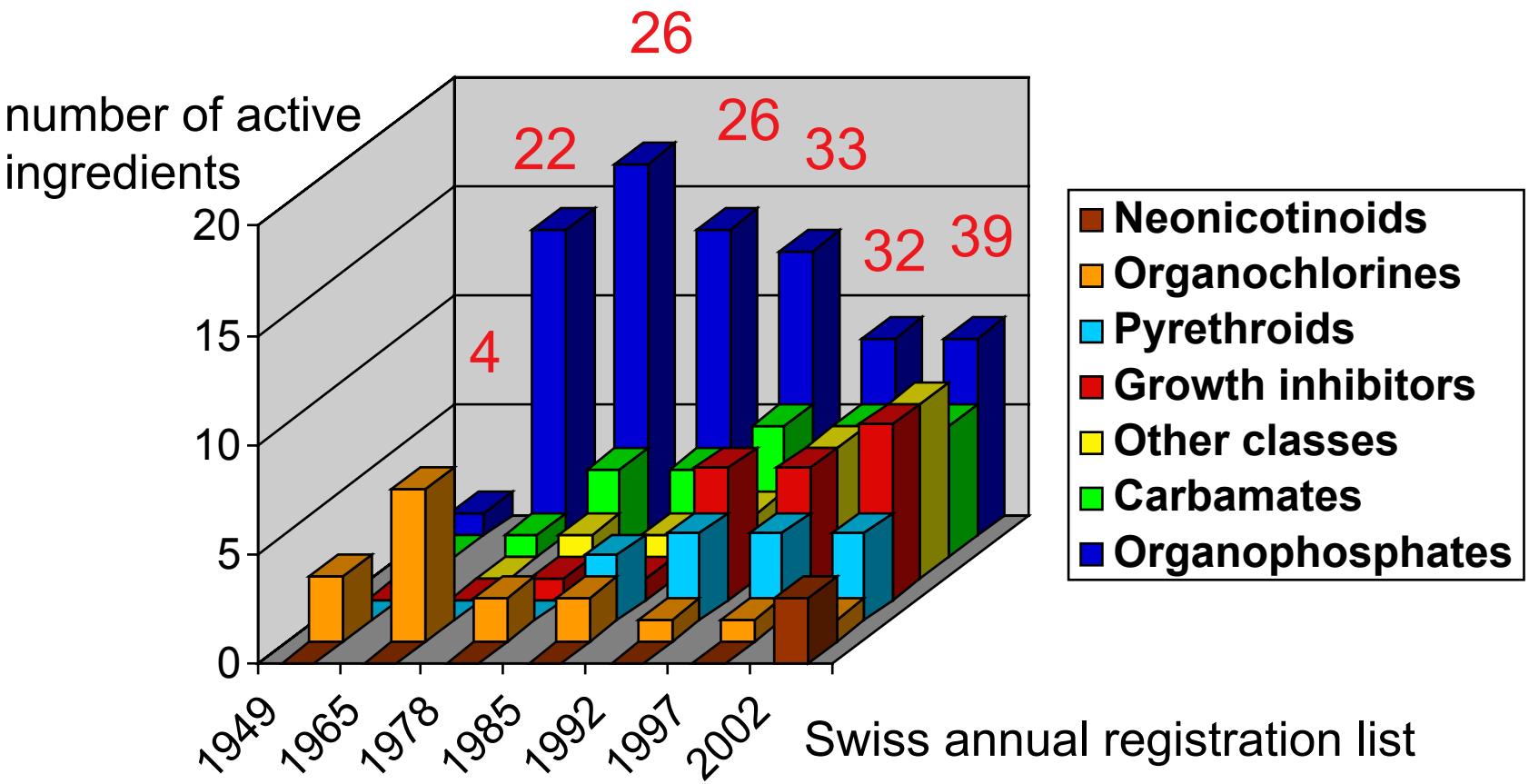
Development of Chemical Classes

- Insecticides used for orcharding or vegetable gardening
- Registration in Switzerland between 1949 to 2002
- Increasing number of active ingredients and chemical classes

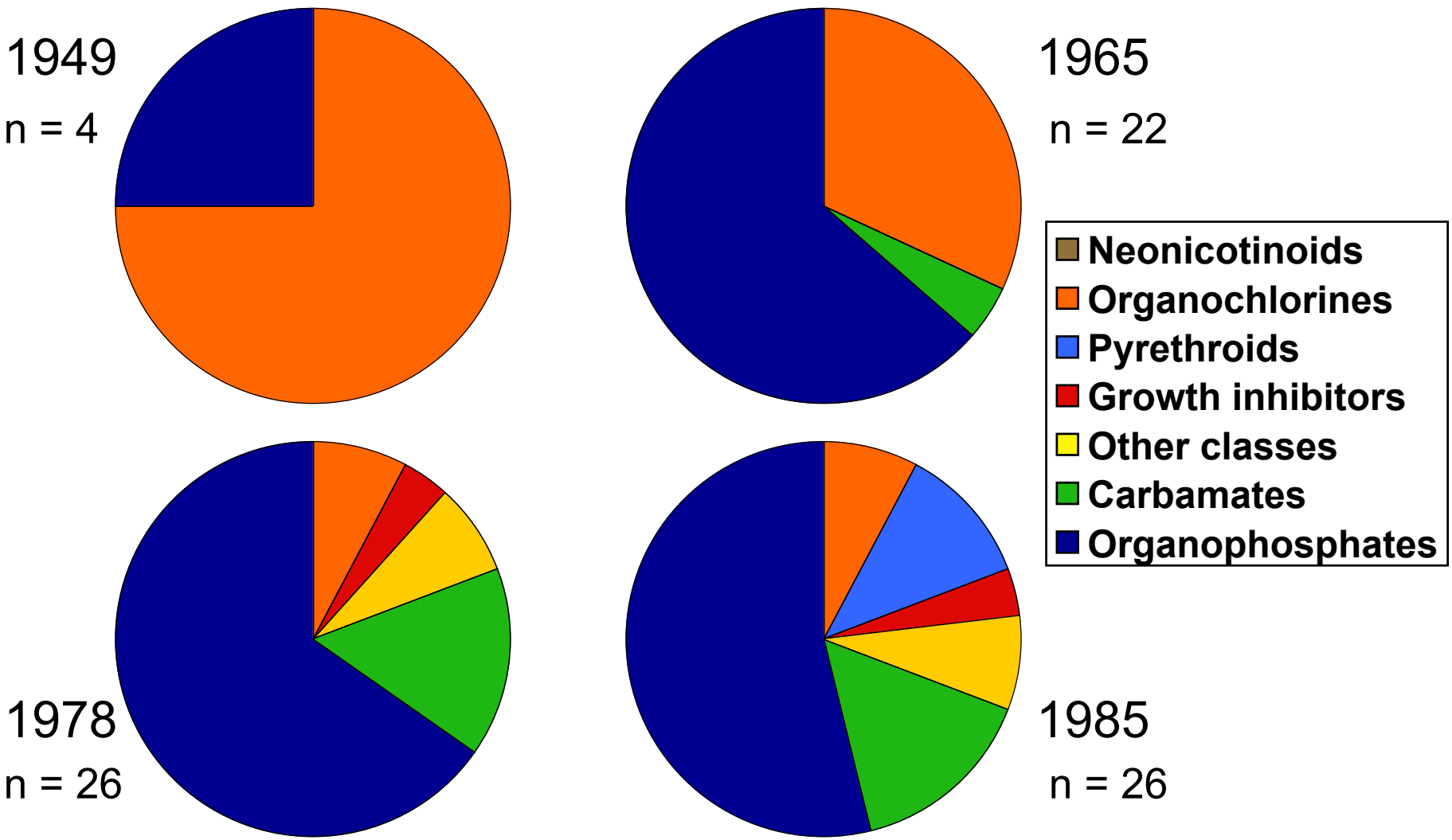


Development of Chemical Classes

Total number of active ingredients:

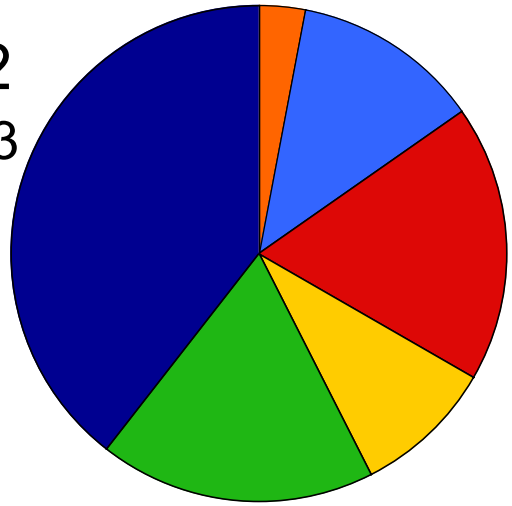


Increasing Number of Chemical Classes (1)

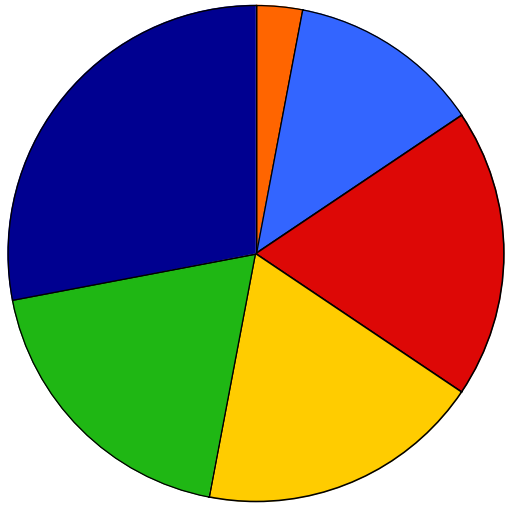


Increasing Number of Chemical Classes (2)

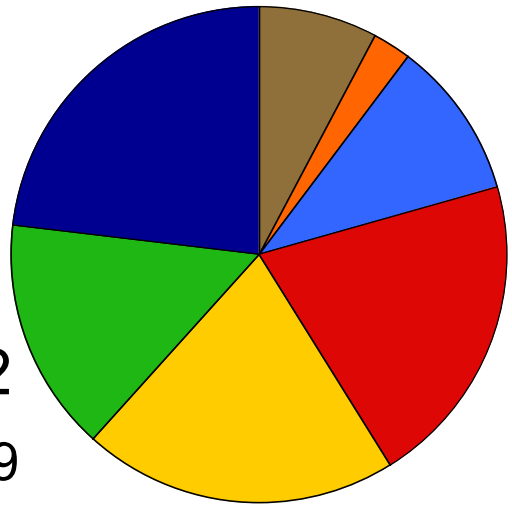
1992
n = 33



1997
n = 32



2002
n = 39



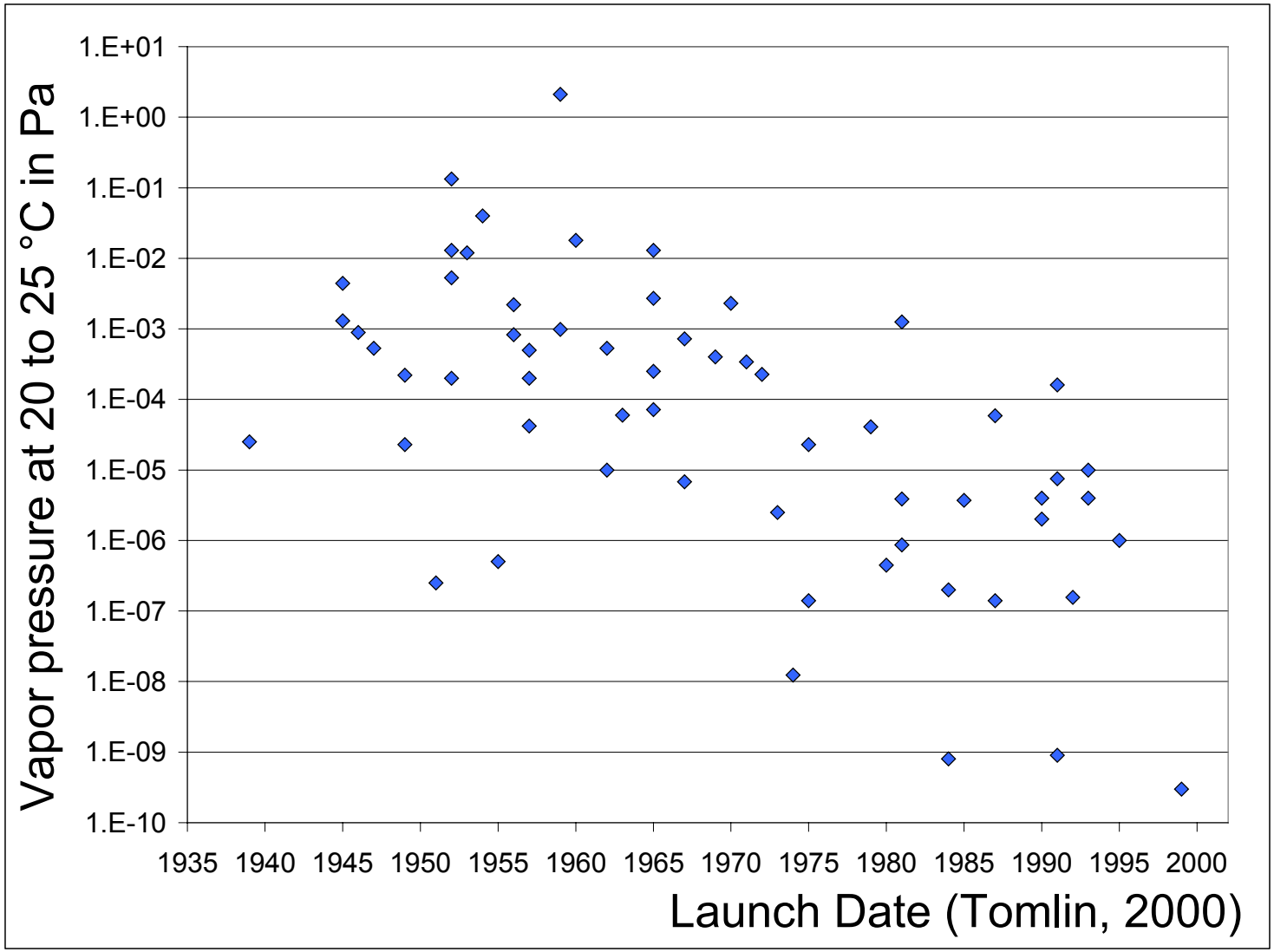
- Neonicotinoids
- Organochlorines
- Pyrethroids
- Growth inhibitors
- Other classes
- Carbamates
- Organophosphates

Present legal status of insecticides

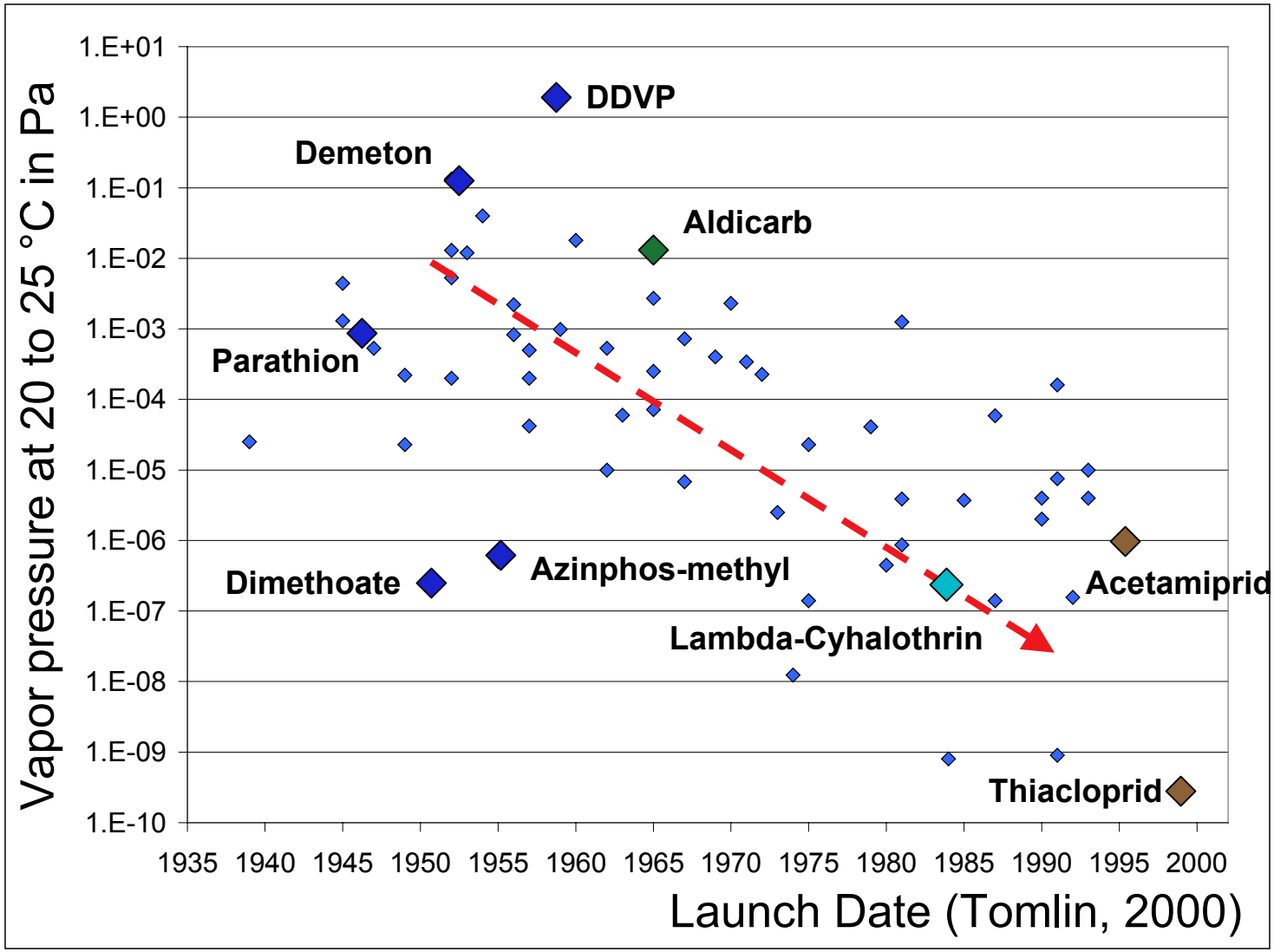
Comparison of currently registered insecticides used in orcharding or vegetable gardening in Switzerland with their status in EU and US:

Active Ingredient	Chemical Class	Swiss Status	EU-Status	US-Status
Parathion	Organo-phosphate	Registered since 1949	Out 01/03	Cancelled, last legal use: 31/12/03
Aldicarb	Carbamate	Registered since 1978	Withdrawal pro-posed to Council	Re-registration candidate 2004
Lambda-Cyhalothrin	Pyrethroid	Registered since 1987	Registered, Annex I	Registered since 1988
Acetamiprid	Neo-nicotinoid	Registered since 2002	Registered, new active substance	Registered since 2002

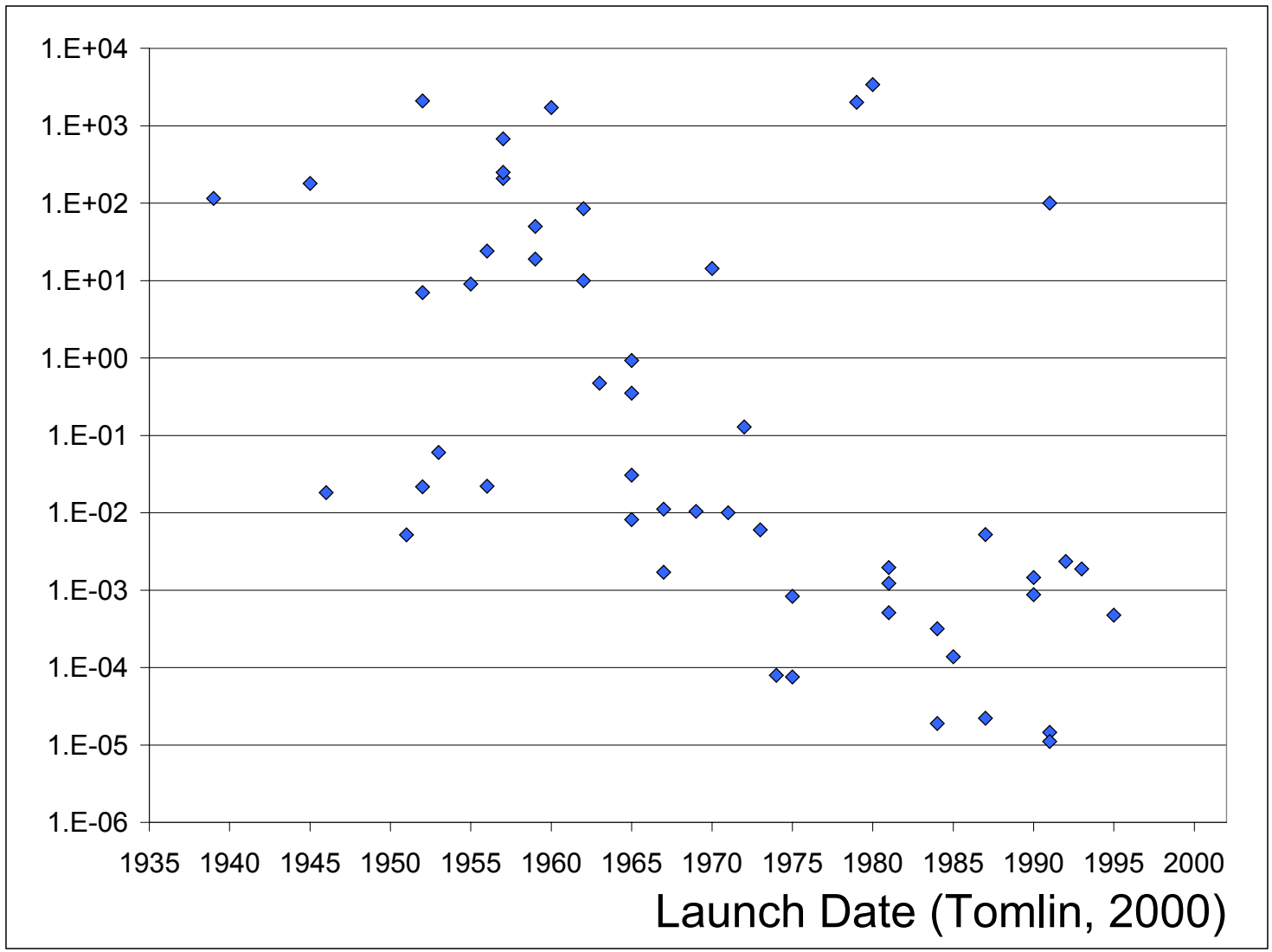
Time series: Vapor pressure of insecticides



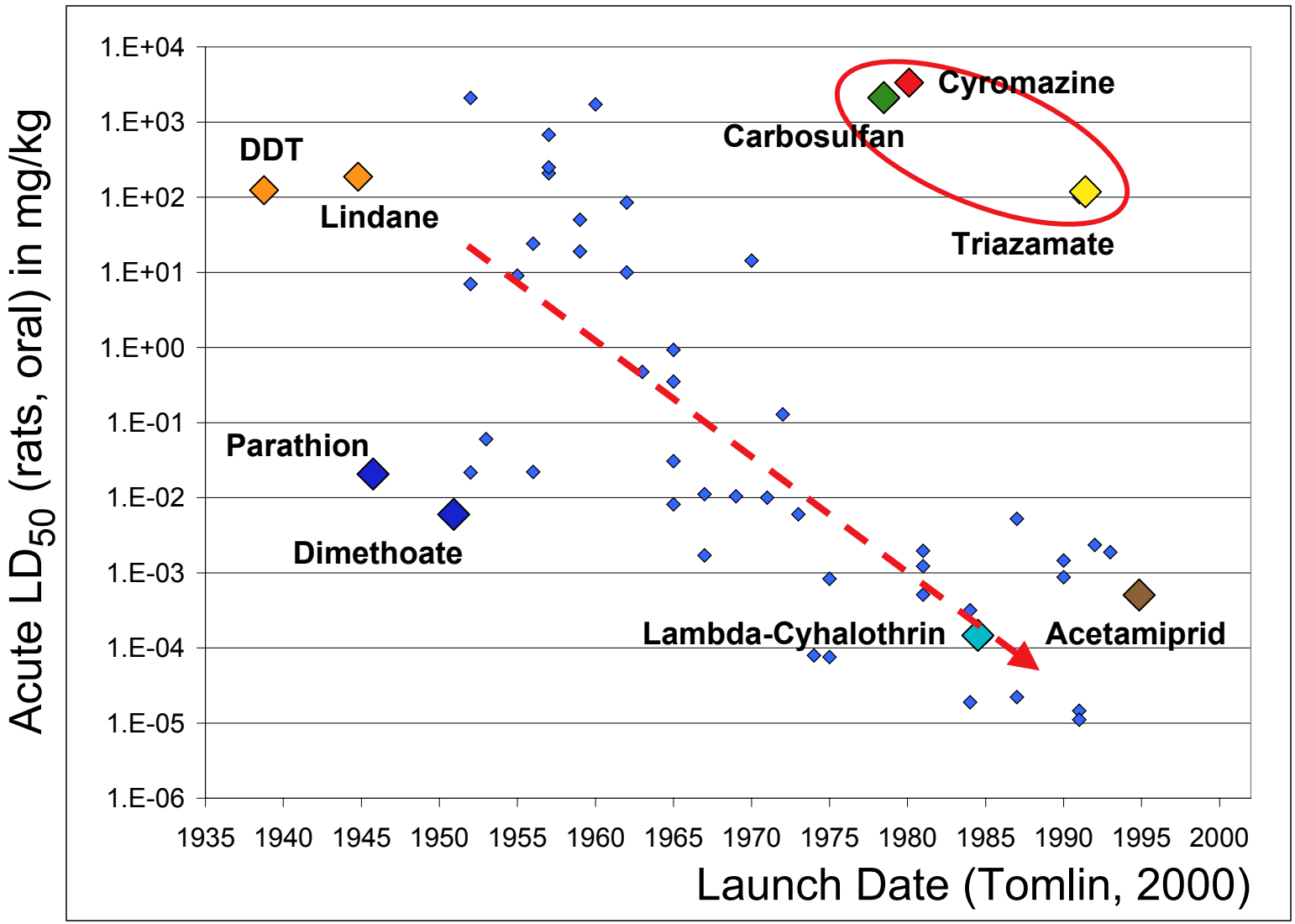
Time series: Vapor pressure of insecticides



Time series: Mammalian toxicity of insecticides



Time series: Mammalian toxicity of insecticides



Trends towards sustainable chemistry?

- Modern insecticide active ingredients are less volatile, i.e. less mobile.
- Trend to higher toxicity: the use of insecticides has become more dangerous.
- Further investigations are needed to answer the sustainability question ...
- ... and will be part of the dissertation project!

Quality ranking of data sources

Decreasing quality

1. Registration or re-registration dossiers of the producers
2. EU-Monographs subject to Directive 414/91/EEC
3. US-EPA-Dossiers subject to FIFRA
4. Pesticide Manual (Tomlin, 2000)
5. Handbooks and databases, e.g., Mackay et al., 1997; Hornsby et al., 1996; Howard et al., 1991

Decreasing availability

Conclusions

✓ Today many more active ingredients of several chemical classes are in use and some of their properties have changed in the last 50 years.

✓ As a result of registration and re-registration processes in EU and USA, recent official documents contain reviewed and updated data about active ingredients.

✓ Compared to more easily available data of manuals or electronic databases, EU-Monograph or EPA-Dossier data should be preferred because of their higher quality:

- Data have been assessed and discussed by experts.
- Modern GLP standards have been applied in generating new data.