PAN Workshop „Pesticide Reduction Programmes in Germany and the UK“
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Approaches and experiences in Germany and the UK:

Farmers` experience in Germany

Erich Jörg

(DLR - RNH, Agricultural Public Service Centre)
Rhineland-Palatinate, Bad Kreuznach

- **Statement on pesticide use**

- **Approaches for pesticide use reduction**
  - **pesticide quantity and quality**
  - **successes and failures**
  - **hot spot: „pesticides in surface water“**

- **Perspectives and the German Pesticide Reduction Programme**

Statement on pesticide use

The necessary amount of pesticides to be used is very difficult to calculate.

It is strongly weather dependent, especially insecticides, fungicides and acaricides, and thus varies from year to year.

It is strongly influenced by the crops/cultivars grown, which in turn is driven by the market.

The quality of pesticides and pesticide application has been improved and this process will continue.

Agricultural production systems also in future will depend on pesticide use, which has to be optimised and minimised.

Approaches for pesticide use reduction

1. Reducing the need for pesticide applications

2. Improving decision support for pesticide applications

3. Improving pesticide applications

4. Replacing pesticides by biological/biotechnical control

5. Improving spraying quality and handling of equipment

6. Landscape management

(protection of watercourses by creating linear structures, e.g. hedgerows, buffer zones)

Pesticide and water

Reducing the need for pesticide applications

(Preventive measures within IP)

-crop rotation: lowers the risk of perennial weeds and soil-borne pests and diseases

Successful: vegetables included into arable crop rotation⇒
less insecticide, fungicide and residual herbicide use,

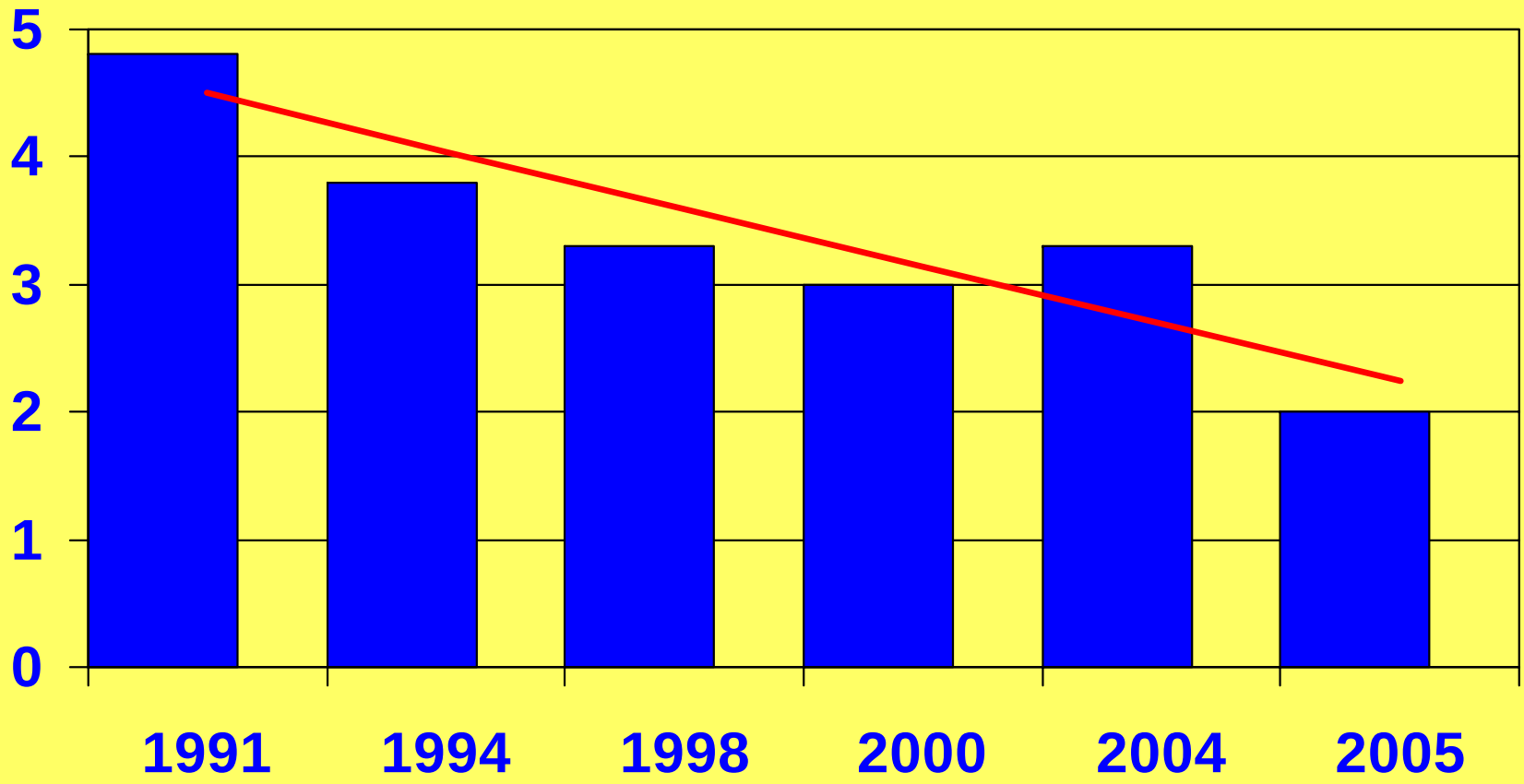
limits: -vegetable crops need irrigation (limited area)
-more and more crops no longer are grown due to economical reasons (e.g. leguminosae, sunflowers...)

-cultivar choice: lowers the risk of fungal disease epidemics

Successful: tendency to grow less susceptible cultivars in cereal and sugar beet production⇒
less fungicide use (0,5-1⇓)

Average Powdery Mildew Susceptibility

**(6 most popular winter wheat cultivars in Germany;
BSA-grading: 9=highly susceptible, 1=resistant)**



The trouble is:
***Septoria tritici* - susceptibility is 5,4 !**

Further trouble is:
Market partners sometimes prefer susceptible cultivars (quality reasons).
(e.g.contracts for pasta wheat; fruits; vegetables)

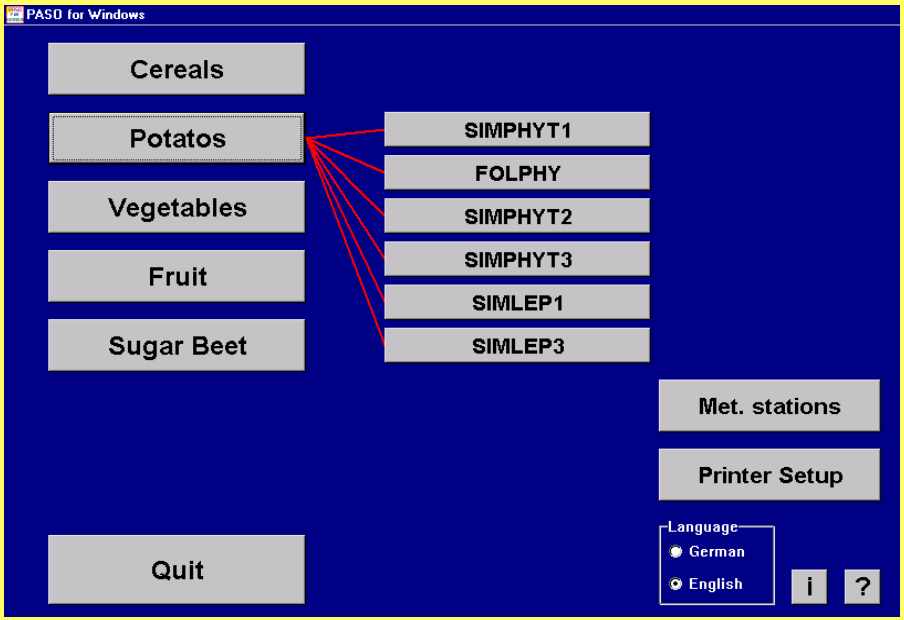
Resistance may be overcome by the pathogens which may lead to increased fungicide use in some years.
(e.g.YR29 virulence of stripe rust of wheat ⇒more fungicides in 1998 and 1999)

Improving decision support for pesticide applications

From calendar spraying to DSSs...

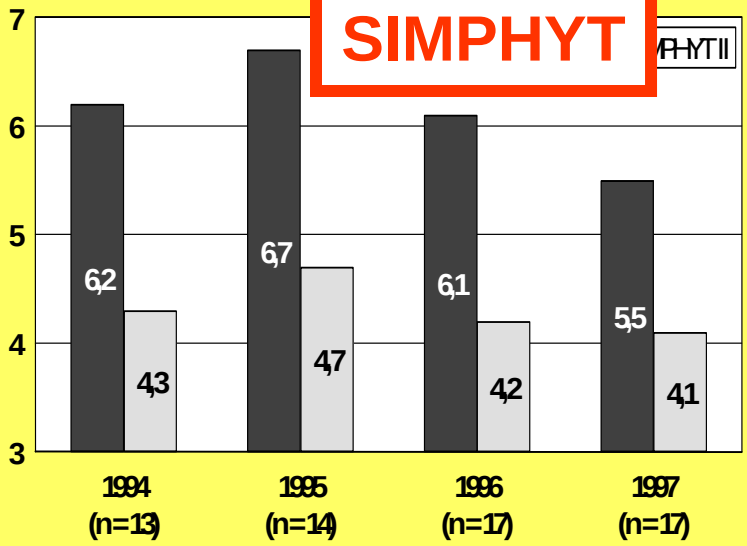
-action thresholds: pests and diseases in arables and fruit crops

-DSS: pests/diseases in arable crops



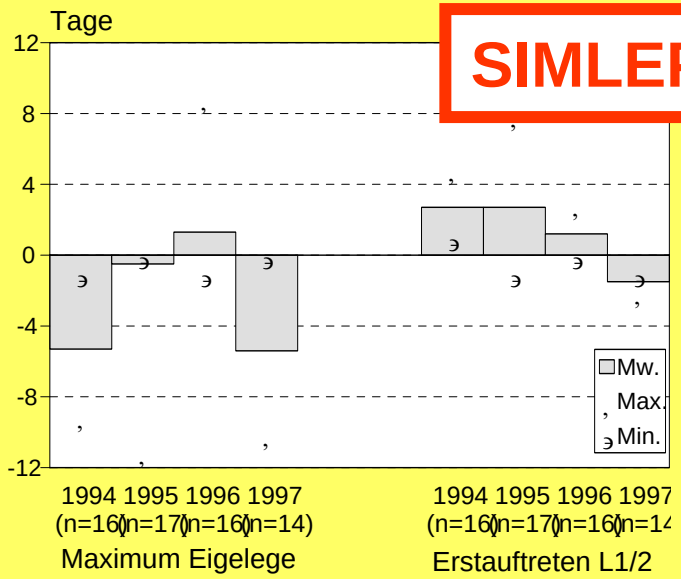
DSS help in estimating the necessity for pesticide use, reduce labour for field inspections and reduce fungicide and insecticide use.

SIMPHYT



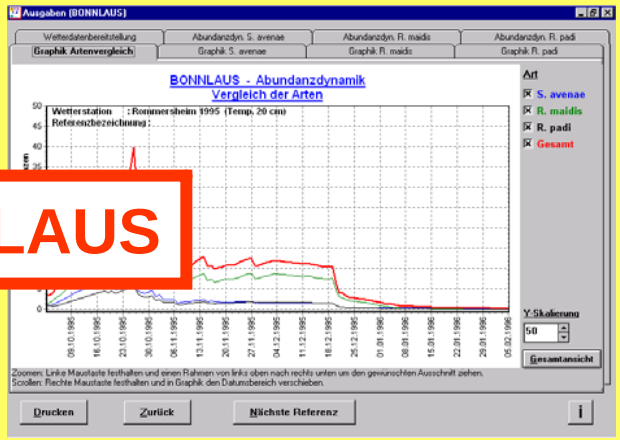
..reduced the number of fungicide applications (av. -2) in potatoes

SIMLEP



..stopped the joint fungicide - insecticide applications in potatoes and reduced number of sprayings

BONN-LAUS



..reduced the number of insecticide applications in cereals for aphid control in autumn and winter

Erich Jörg

DLR Rheinhessen-Nahe-Hunsrück

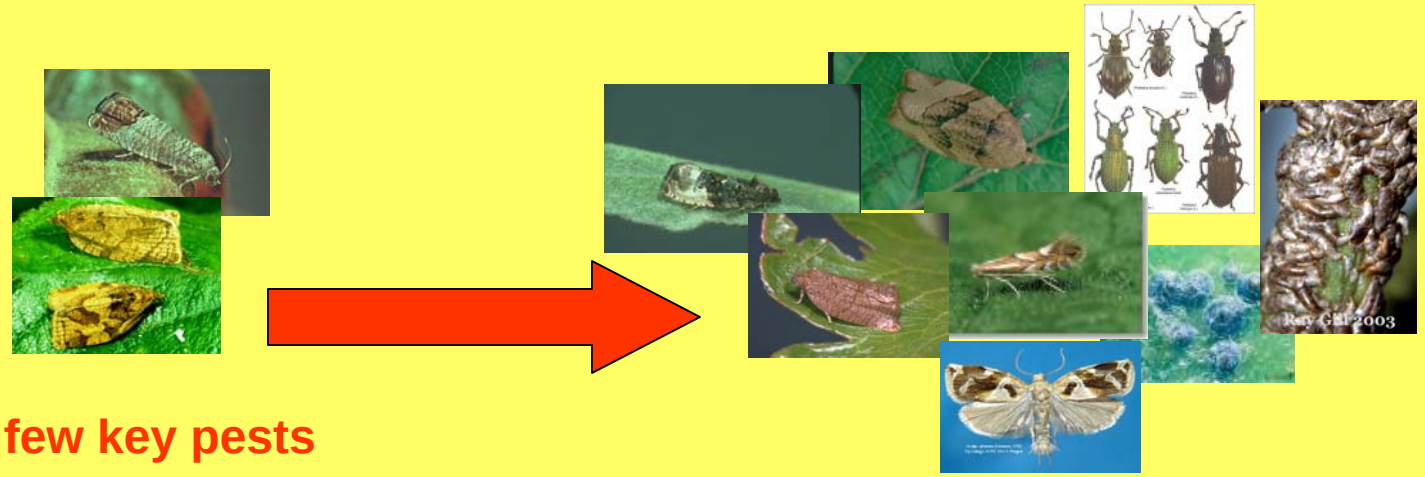
Improving pesticide applications

-qualitative aspects:

least toxic, least persistent, selective products chosen

success: no OC, OP⇓, no harmful fungicides
no persistent herbicides, no „W“-restriction
acaricides ⇓ in fruit production

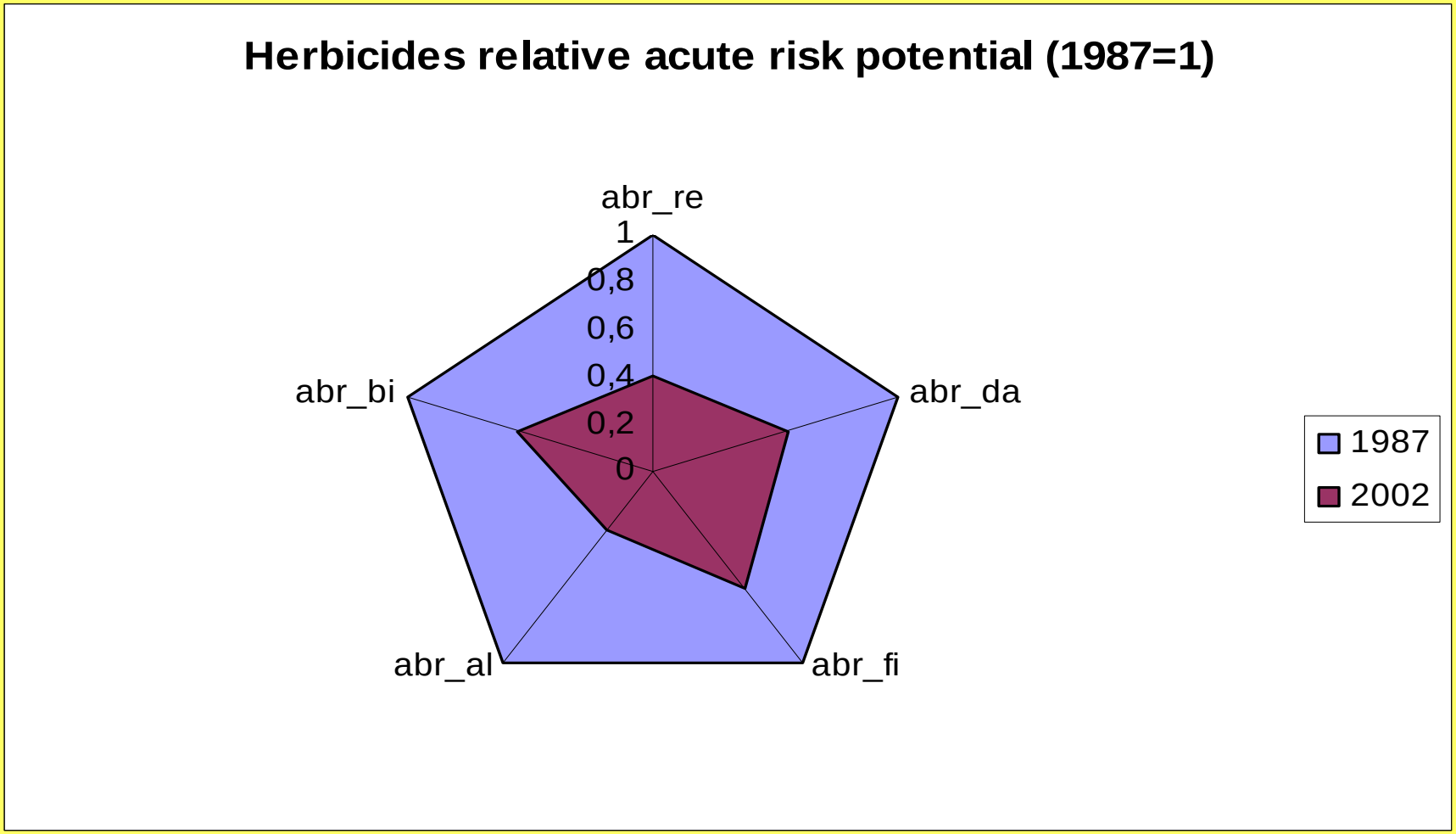
problematic: sometimes increase in insecticide use



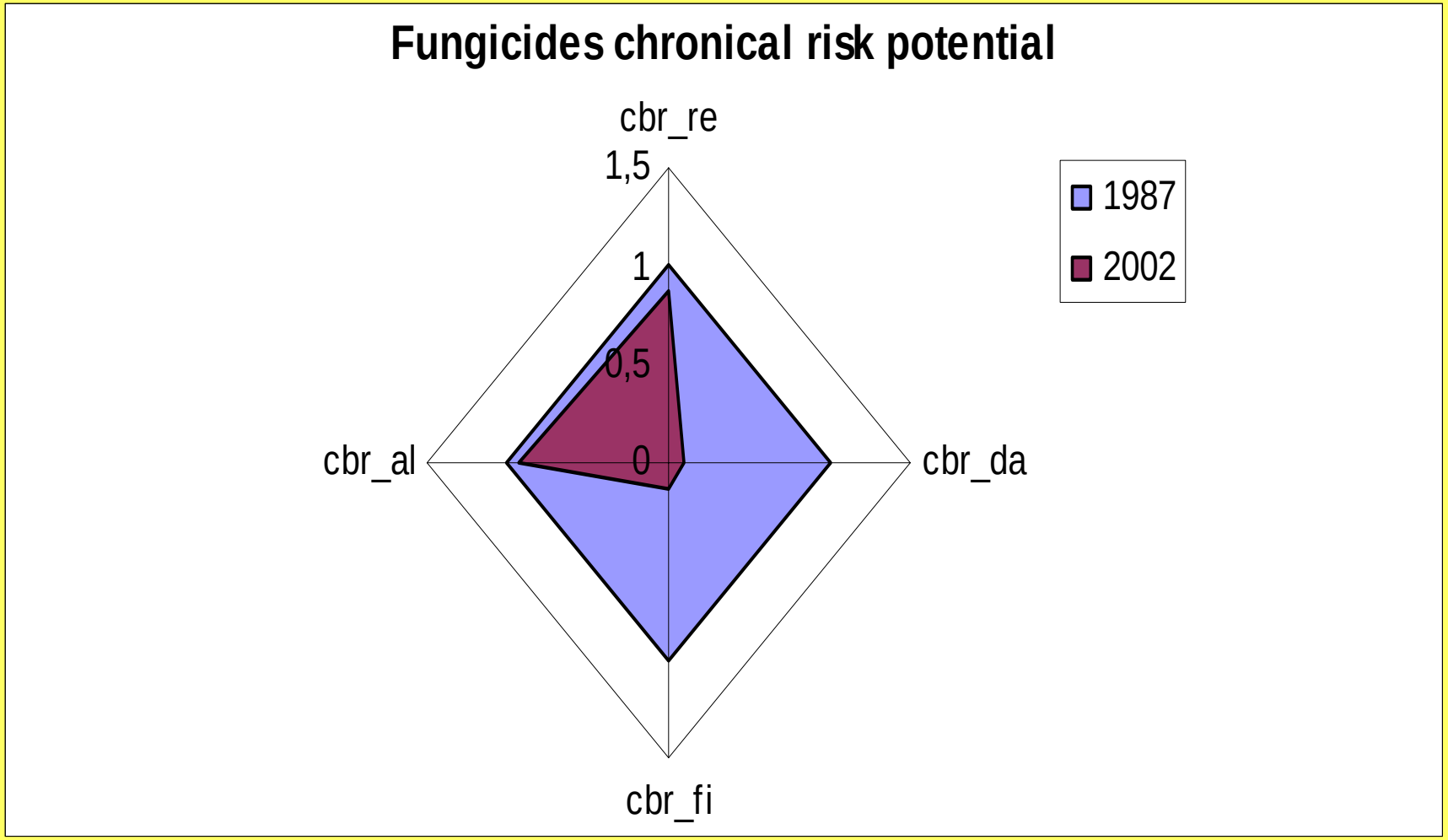
a few key pests

more minor pests

Improved quality of pesticides 1



Improved quality of pesticides 2



-quantitative aspects: reduced dosage rates

success:

- -herbicides 50-75% of registered dosage rate (arables)
- -fungicides 66-80% of registered dosage rate (arables)
- -additives to improve control efficacy when dosage reduced
- -fruit production RP: „1 fold conc. on 1000 l/ha“=2/3 r.d.r.
- -fruit prod./viticulture: weedfree strips in established orchards

problematic:

- -rapid development of resistance due to replicated application of too strongly reduced dosage rates (Northern Germany: powdery mildew of cereals, some monocot weeds...)

Hot spot: „pesticides in surface water“

- improved spraying equipment mainly nozzle technique (drift reducing)

- regular maintenance and calibration of equipment

- cleaning of spraying equipment

Sprayer cleaning not on sites that are connected to canalisation.

New sprayers are equipped with clean water tank and cleaning devices.

Sprayer cleaning in the fields.

Successful extension and information campaign for arable farmers, to be expanded to fruit and wine growers.

Replacing pesticides by biological/biotechnical control

..is possible only on a limited scale

Successful examples are

- biological pest control in glasshouses +++
- spider mite control by *Phytoseids* in orchards +/++
- corn borer control in maize crops +
- mating disruption for *Tortricid* moths in viticulture +++
- *Bacillus thuringiensis* - insecticides (vegetables, potatoes) +

Problems are

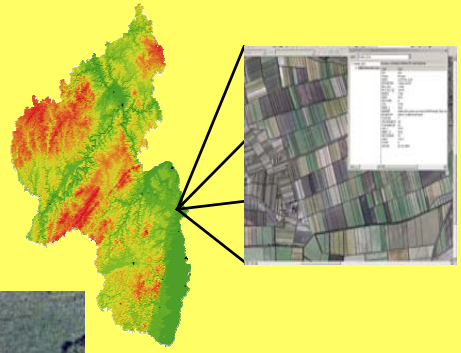
- biological control is too expensive
- control efficacy is less than with chemical control
- biological/biotech. control is restricted to specific conditions
- methods are available only for a few pests

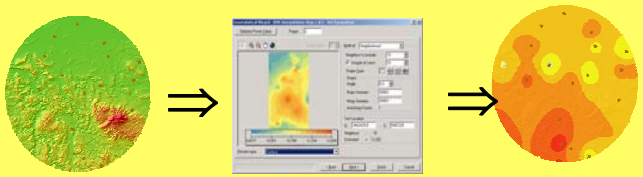
Perspectives and the German Pesticide Reduction Programme

Progress towards reduction driven by...

- **Improved cultivar resistance** (arable crops, viticulture,e.g.“Regent“)
- **Improved DSSs** (arable crops, vegetables)

plot-specific DSSs by employing GIS-technology





•**application technique** **(fruits, viticulture)**

Sensor equipped sprayers

•**incentives should be directed to adoption of safe techniques and measures**

Goals of the German Pesticide Reduction Programme will not easily be met, but with the help of the governmental crop protection services German farmers take all efforts.