Dr. Alastair Leake
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What is Integrated Farm Management?

Dr Alastair Leake
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Norfolk four-course system

Method of agricultural organization established in Norfolk county, England, and in several countries before the end of 17th century; it was characterized by an emphasis on fodder crops by absence of a fallow year.

- Clover and ryegrass for feed the cattle and sheep
- Wheat
- Barley
- Turnips for feeding cattle
Integrated Farm Management

1959 – Birth of the concept of Integrated Control

IPM ➔ ICM ➔ IFM
THE INTEGRATION OF CHEMICAL AND BIOLOGICAL CONTROL OF THE SPOTTED ALFALFA APHID

The Integrated Control Concept
Vernon M. Stern, Ray F. Smith, Robert van den Bosch, and Kenneth S. Hagen

Field Experiments on the Effects of Insecticides
Vernon M. Stern and Robert van den Bosch
The integration of pesticides into IPM

Unsprayed
Natural enemy: Pest ratio: 1:3

Non-selective
Pesticide application

Partially selective
Pesticide application

The importance of natural enemy: pest ratios after pesticide applications
Beetle banks
Typical Aphid Population Curve

Natural enemies arrive too late. Exponential growth already started.

Natural enemies arrive early. Exponential growth delayed or prevented.

Natural enemies can contribute to speed of collapse

Increase abundance of natural enemies at relevant time
Minimise insecticide use

- Effect of an insecticide application on carabid beetles

5 days pre-spray

High numbers

5 days post-spray

Low numbers

19 days post-spray

32 days post-spray

Low numbers

High numbers
Integrated Farm Management

• “Combining cultural, biological and mechanical control techniques with judicious use of chemicals”
• Diverse rotations
• Yield optimisation
• Modified pesticide dose rates
• Threshold approaches?
• Reduced tillage
Threshold approaches to weed management?
Prevention & suppression - cultivations
Reduced tillage practices
Biological Control of Cabbage Stem Flea Beetle in OSR
1. Biological Diversity
   - Maintain wide, healthy rotations and encourage beneficial flora and fauna through reduced artificial inputs

2. Maintain Living Roots
   - To boost soil biology, build soil structure and increase water infiltration

3. Soil Protection
   - Use crop residues and cover crops to provide biological armour to the soil surface and reduce water loss

4. Reduced Soil Disturbance
   - Reduce and optimise mechanical and chemical inputs to improve soil health and structure

5. Integration of Organic Matter
   - Utilise livestock and cover crops to build soil organic matter

5 Principles of Regenerative Agriculture

Healthy Soil → Healthy Crops → Healthy Businesses
SOC changes following land use change, Rothamsted, UK

- Started grass
- Arable to grass
- Grass to arable
- Continued grass
- Continued arable

Movement towards new equilibrium SOC content