

Methodological Approach for the Valuation of Biodiversity

CASE STUDY: valuation of natural predators for biological pest control in pear production, Flanders

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Research objective: development of a methodology for the valuation of biodiversity, taking into account the functional role of species in the ecosystem

1. Biodiversity loss function

SPECIES DIVERSITY ↓

SCENARIO 1

PEST

HUMAN IMPACT

SCENARIO 2

PEST

ECOLOGICAL MODEL

2. Analysis of ESS losses

BIOLOGICAL PEST CONTROL ↓

SCENARIO 1

PEST

HUMAN IMPACT

SCENARIO 2

PEST

ECOLOGICAL MODEL

3. Ecological-economic linking functions

YIELD/QUALITY ↓

SCENARIO 1

PEST

HUMAN IMPACT

SCENARIO 2

PEST

ECOLOGICAL MODEL

4. Private & external costs

Σ (PRIVATE, EXTERNAL) ↑

SCENARIO 1

PEST

HUMAN IMPACT

SCENARIO 2

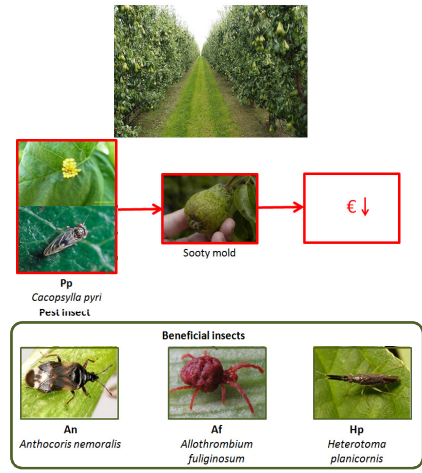
PEST

ECOLOGICAL MODEL

5. Valuation of species diversity

= CONTRIBUTION OF NATURAL PREDATORS TO THE REDUCTION OF PRIVATE AND EXTERNAL COSTS

CASE 1: low strain pear production Flanders, BE



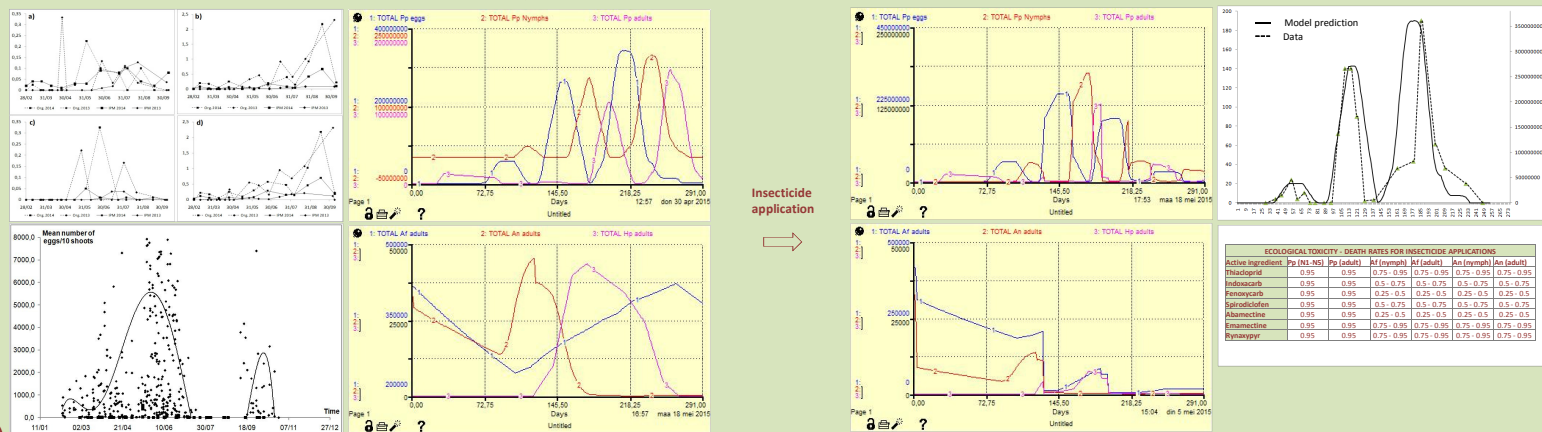
1. BIODIVERSITY LOSS FUNCTION

Data collection

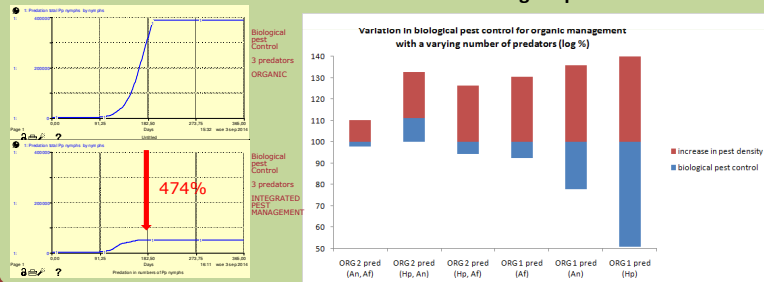
Scenario 1: Organic production

Scenario 2: Integrated Pest Management

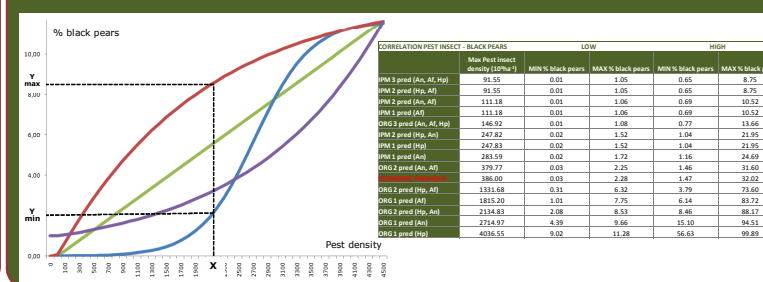
Model calibration



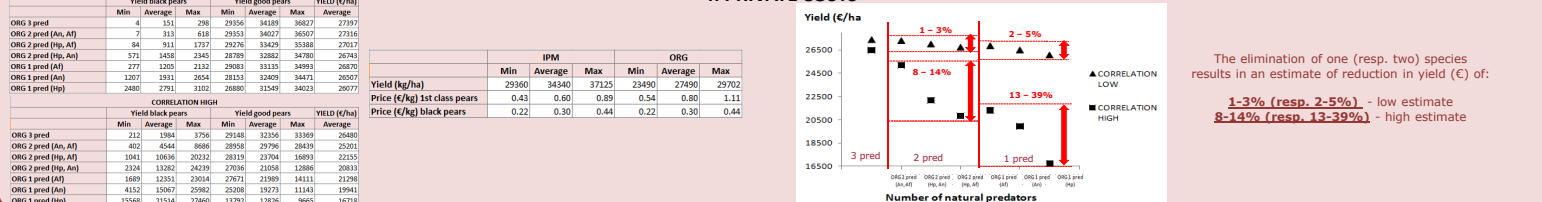
2. ANALYSIS OF ESS LOSSES - reduction in biological pest control



3. ECOLOGICAL – ECONOMIC LINKING FUNCTIONS



4. PRIVATE COSTS



5. VALUATION OF SPECIES DIVERSITY - natural predators presence in pear production

The value of species diversity is estimated based on the ecological function of the species in the ecosystem (biological pest control). The reduction in farm income due to the loss of natural predators as presented here is a conservative estimate due to:

- Only minimal death rates for natural predators have been taken into account.
- Empirical field data suggest the pest density in IPM to be significantly higher than modelled, resulting in a higher biological pest control losses.
- The external effects of pesticide use on humans and environment have not (yet) been taken into account.
- The additional benefits of increased diversity on higher trophic levels have not been included.