

Ecological assessment with Syrph the Net: the case of four stands in a *Fagus-Abies* forest in Hautes-Pyrénées (South-Western France)

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- Introduction - (2/28)

Why such a study ?

- ✓ CRPF (Regional Center of Forest Property) in Midi-Pyrénées
 - ↳ important study on the **impact of forest management on biodiversity** (several zoological, botanical and fungal groups)
 - ↳ **zoological group** sensitive to the presence/absence of various **forest microhabitats**, and for which ecological requirements are **known**
 - ↳ **zoological group** allowing to assess an ecological state in relation to a disappeared optimal ecological integrity
- ✓ Biodiversity survey → state for the future: great risk of an insidious loss of species

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- Introduction -

✓ CRPF included Syrphids in its study

✓ Hypothesis: **"Structure of syrphid communities will reveal differences between stands induced by different forest management types"**

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- Study sites and methods - (4/28)

• *Fagus-Abies* forest (category 43 in the CORINE system)

- 1000 ha
- 850 to 1100 alt. m.
- presently managed for firewood production, grazed
- during 18th & 19th centuries, intensively managed for charcoal making (stopped around 1950), grazed

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- Study sites and methods -

✓ **Characteristics of the four studied stands**

⊖ *Fagus-Abies* stand, almost unexploited in the last 100 years, with young, mature and overmature trees

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- Study sites and methods -

⊕ *Fagus-Abies* stand: young, mature and overmature *Fagus*, and scattered young and mature *Abies*; exploited 50 years ago

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- Study sites and methods -


③ **Fagus stand**, with young and mature trees, and with scattered young *Abies*; intensive thinning 20 years ago (dominated and diseased trees removed)



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- Study sites and methods -

④ **Acidophilous Quercus stand**, with young and mature trees, and with scattered mature *Betula*; it is a man-made substitution forest, unexploited in the last 50 years




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- Study sites and methods -

✓ **Trapping method**

Malaise traps



2 traps in each stand,
from the beginning of May
to mid-October 2004

*Syrphid lists of each pair of traps have
been gathered in the Results*

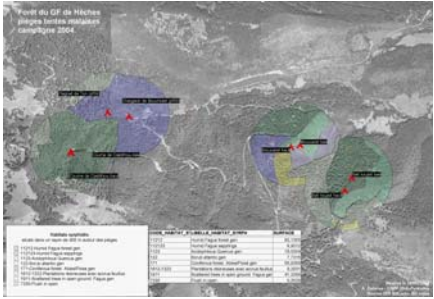
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- Study sites and methods -

✓ **Description of the four studied stands**

For each stand:

- habitat and supplementary habitat(s) coded through *Syrph the Net*
- plus all the habitats within 400 m. around each trap



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- Study sites and methods -


✓ **Analysis**

For each stand, results compared to the syrphidfauna predicted for:

- the **current habitats** (*Syrph the Net* terminology)

① **Humid Fagus saplings, mature, overmature trees**
+ **Abies/Picea saplings, mature, overmature trees**

plus suppl. habitats:
grassy clearing




and

seasonal brook

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- Study sites and methods -

② **Humid Fagus saplings, mature, overmature trees**
+ **Abies/Picea saplings, mature trees**




plus suppl. habitat:
tracksides

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- Study sites and methods -

③ Humid *Fagus* saplings, mature trees
+ *Abies/Picea* saplings

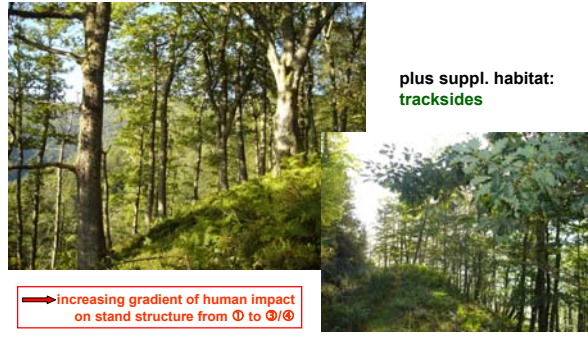


plus suppl. habitat:
tracksides

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- Study sites and methods -

④ Acidophilous *Quercus* saplings, mature trees
+ *Betula* mature trees



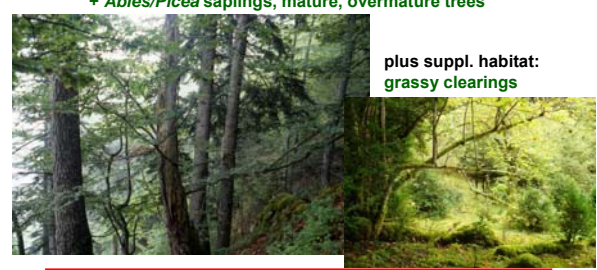
plus suppl. habitat:
tracksides

→ increasing gradient of human impact
on stand structure from ① to ③/④

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- Study sites and methods -

• the potential habitat (*Syrph the Net* terminology)
everywhere, without the ancient and present human impact:
Humid *Fagus* saplings, mature, overmature trees
+ *Abies/Picea* saplings, mature, overmature trees



plus suppl. habitat:
grassy clearings

→ potential habitat = stand ① habitat
stand ① can be considered as the current habitat reference

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- Results - (16/28)

❖ Faunistic and patrimonial analysis

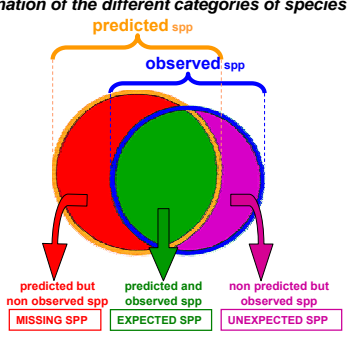
<p>✓ Number of species</p> <p>▪ total nb: 88</p> <p>▪ per site: • ① 70 • ② 54 • ③ 17 • ④ 31</p>	<p>✓ Number of species only found in:</p> <p>• ① 26 • ② 11 • ③ 0 • ④ 4</p>
<p>✓ Number of patrimonial species (i.e. threatened or decreasing in Eur and/or Fr)</p> <p>▪ total nb: 8</p> <p>▪ per site: • ① 6 • ② 5 • ③ 2 • ④ 3</p>	<p>✓ Number of patrimonial species among the species linked to*:</p> <p>• ① 4 • ② 3 • ③ 0 • ④ 0</p> <p>* they can effectively breed in these stands</p>

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- Results -

❖ Ecological analysis

explanation of the different categories of species



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- Results -

what do these categories mean? what can we do with them?

UNEXPECTED SPP

→ their % among the observed spp is often small, but if it is not:
"is the habitat description certain?"

- if Yes → some species come from other habitats in the vicinity
- if No (intermingled hab.) → the prediction have to take into account other habitats

EXPECTED SPP

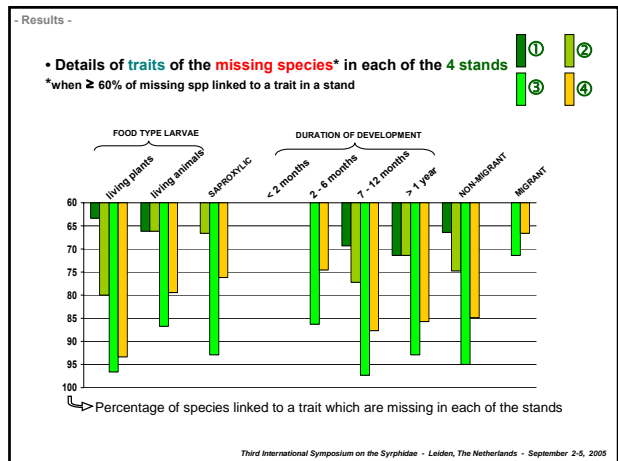
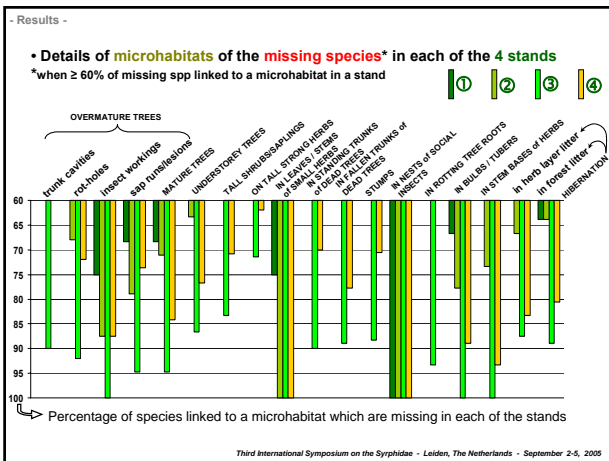
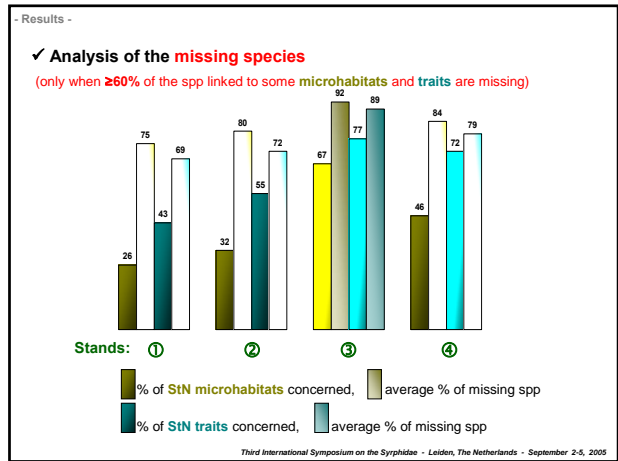
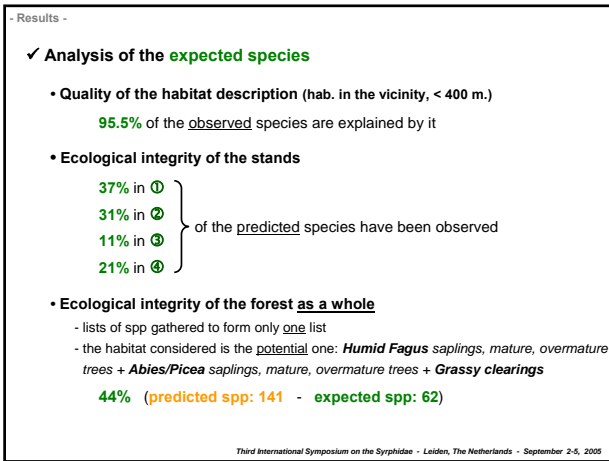
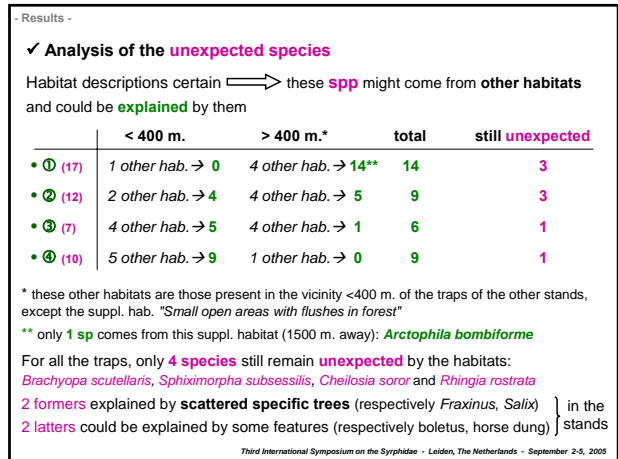
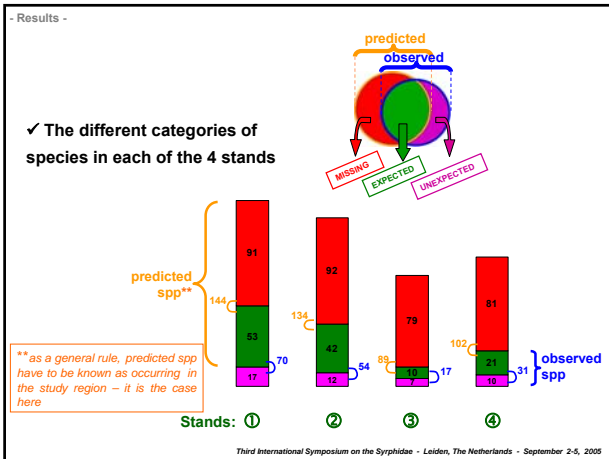
→ their % among the observed spp is in proportion to the quality of the habitat description

→ their % among the predicted spp is in proportion to the ecological integrity of the habitat(s)

MISSING SPP

→ their % among the predicted species is in inverse proportion to the ecological integrity of the habitat(s), and the biological/ecological traits of these species inform about what could have affected the habitat(s)

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- Discussion - (25/28)

- ✓ Low number of "finally unexpected" species per stand and for all of them
 - high percentage of expected among the observed species
 - good quality of the habitat descriptions
- ✓ Several structure parameters of syrphid communities reveal an increasing lack of species in the stands from ① to ③ / ④ :
 - nb of observed species per stand (id. for nb of predicted spp):
 - nb of patrimonial species per stand (among the spp linked to them):
 - % of missing species per stand:
 - % of expected species per stand:

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- Discussion -

- ✓ Low percentages of expected among predicted species:
 - per stand → low ecological integrity of each of them decreasing from ① to ③ / ④ even disastrous for ③ !
 - for the forest as a whole, considered as the potential habitat → average ecological integrity

Both ancient and recent past of the forest might explain this ecological state

Courage, flyons!

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- Discussion -

"Any piece of wood is good to make charcoal"

"A commercial forest has to be homogeneous and neat"

All categories of trees have lost some of their associated syrphid species: overmature and mature trees, understorey trees, tall shrubs/saplings, dead trees

"Cattle and horses always find something to graze in forest"

"Boars and deers belong to the local hunting heritage"

Any herb part which is between 10 cm below the ground surface to 2 m above it, has apparently suffered from the animal tooth and foot

✓ All the species have not been caught

Yes, but: % threatened spp among missing spp more than 10 times higher than among the expected species

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- Conclusion - (28/28)

In this study, structure of syrphid communities:

- differences between stands induced by different forest management types
- impact of herbivorous mammals
- impact of ancient charcoal making

The great adventure continues!

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