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# Looking for correlations in FutMon data

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FutMon Meeting, Tampere

# Defoliation scores

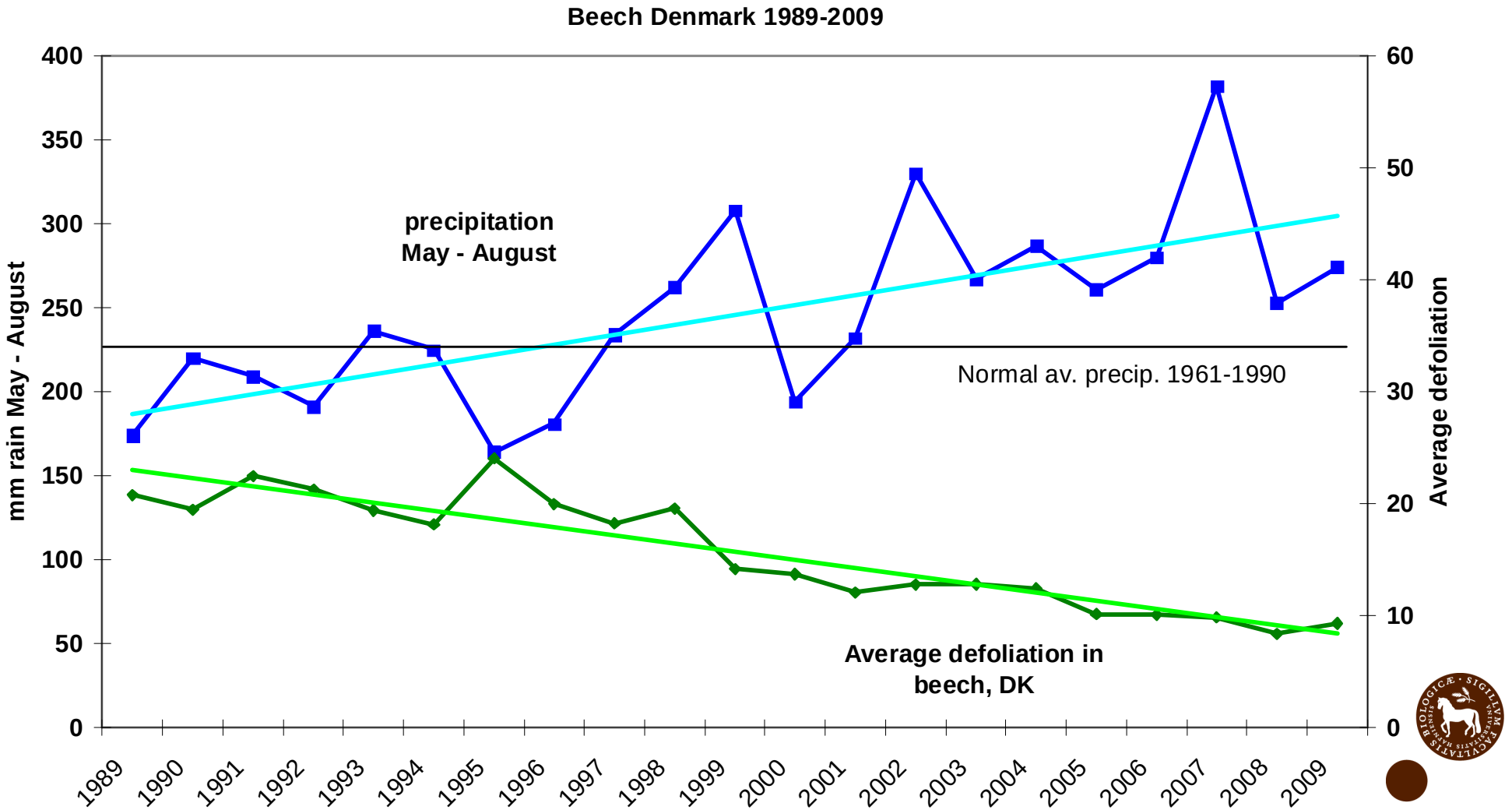
Can they be correlated to:

- Precipitation in the growth season
- Biotic damage, especially defoliators
- Fruiting
- Growth (year rings)

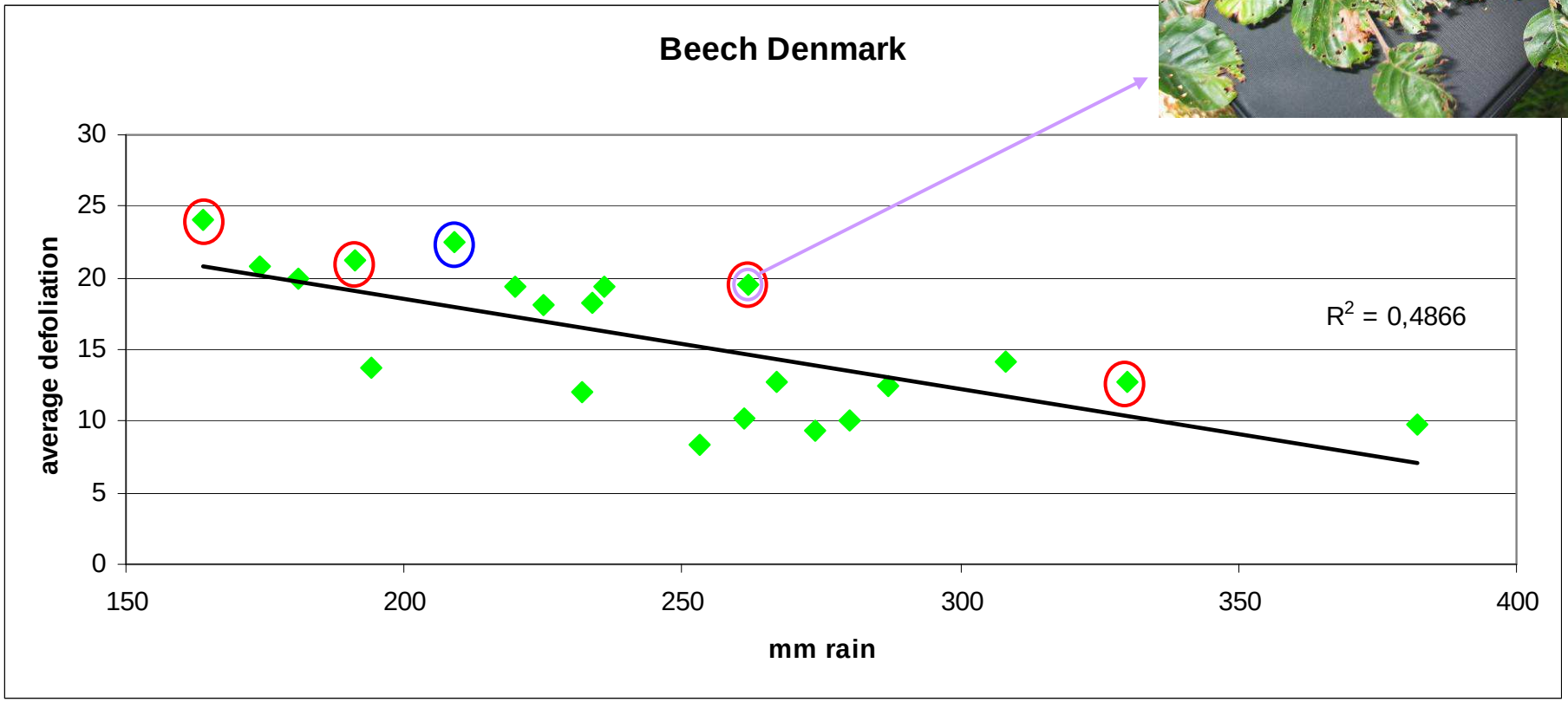
Can we also correlate with:

- Litterfall
- Soil water
- Other factors

# Precipitation and defoliation



# Precipitation and defoliation

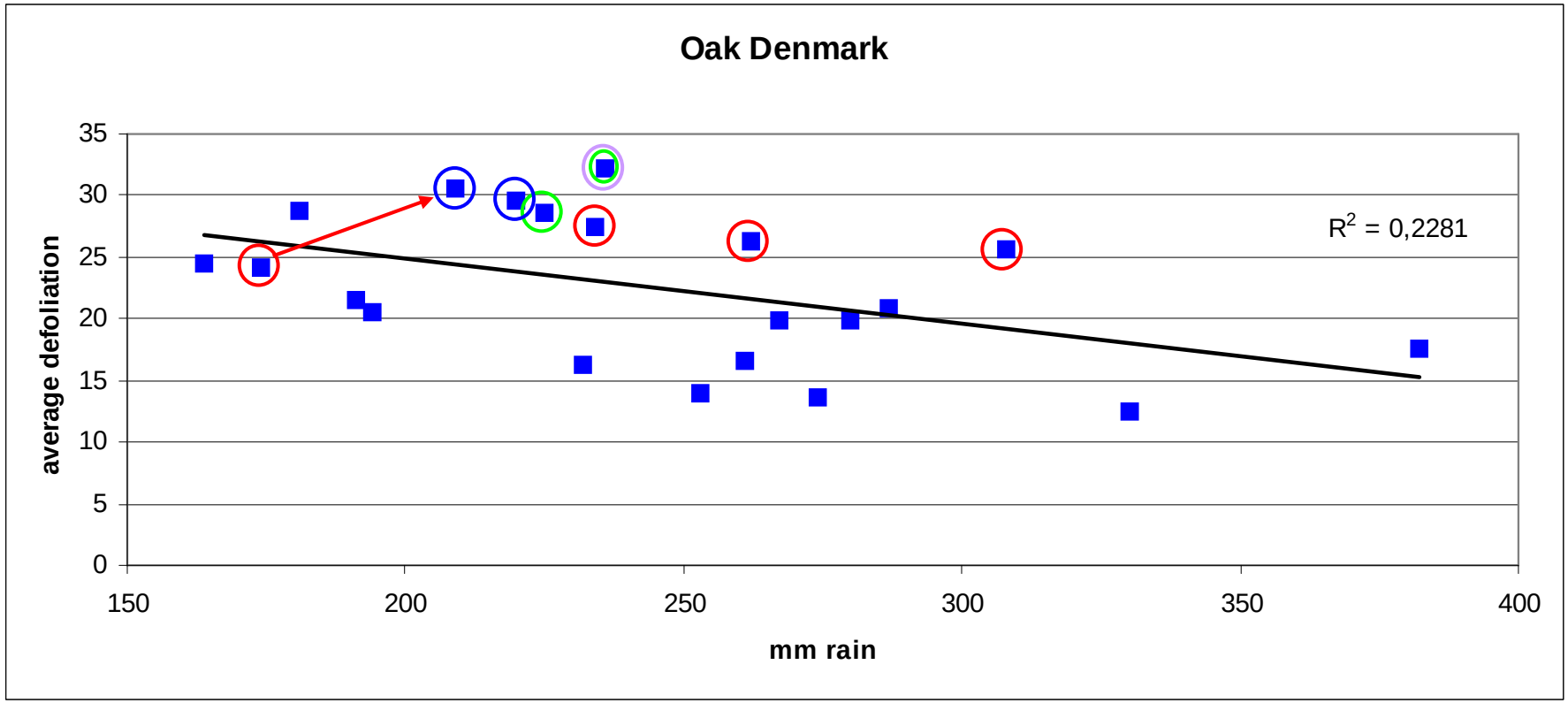



○ = heavy fruiting / mast

○ = *Rhynchaenus fagi* damage

○ = spring storm leaf damage

# Precipitation and defoliation




○ = spring defoliation by caterpillars

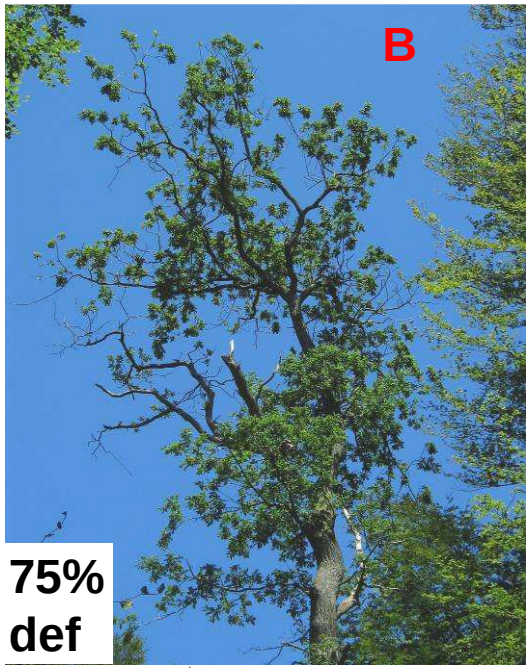
○ = Armillaria attack on weakened trees

○ = drought induced shoot shedding late summer in previous year +

○ = stunted flushing

*Operophthera brumata*

170 year old oak
7 years after severe spring defoliation by caterpillars

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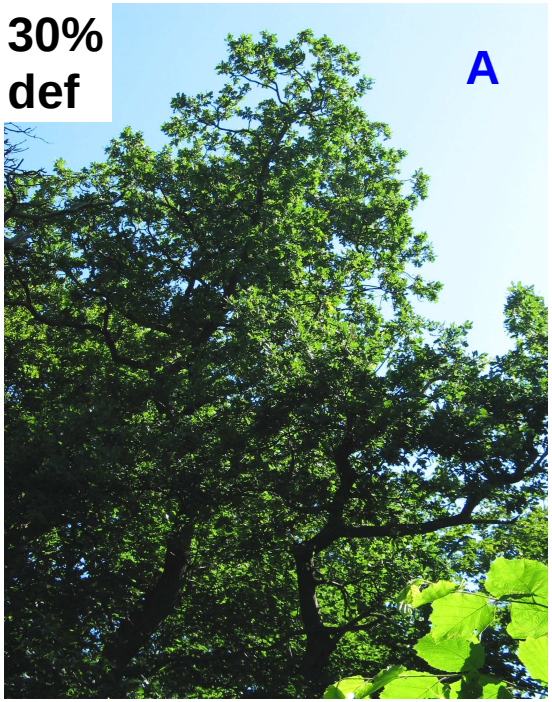
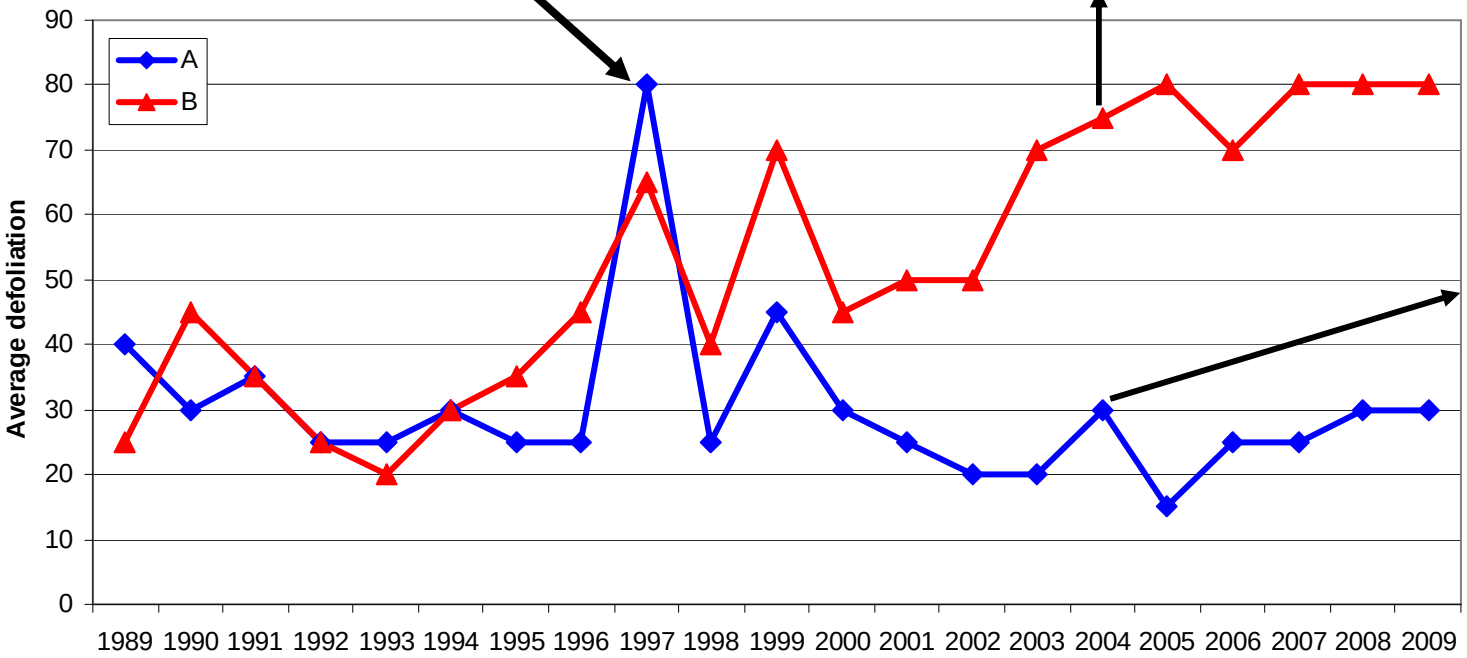
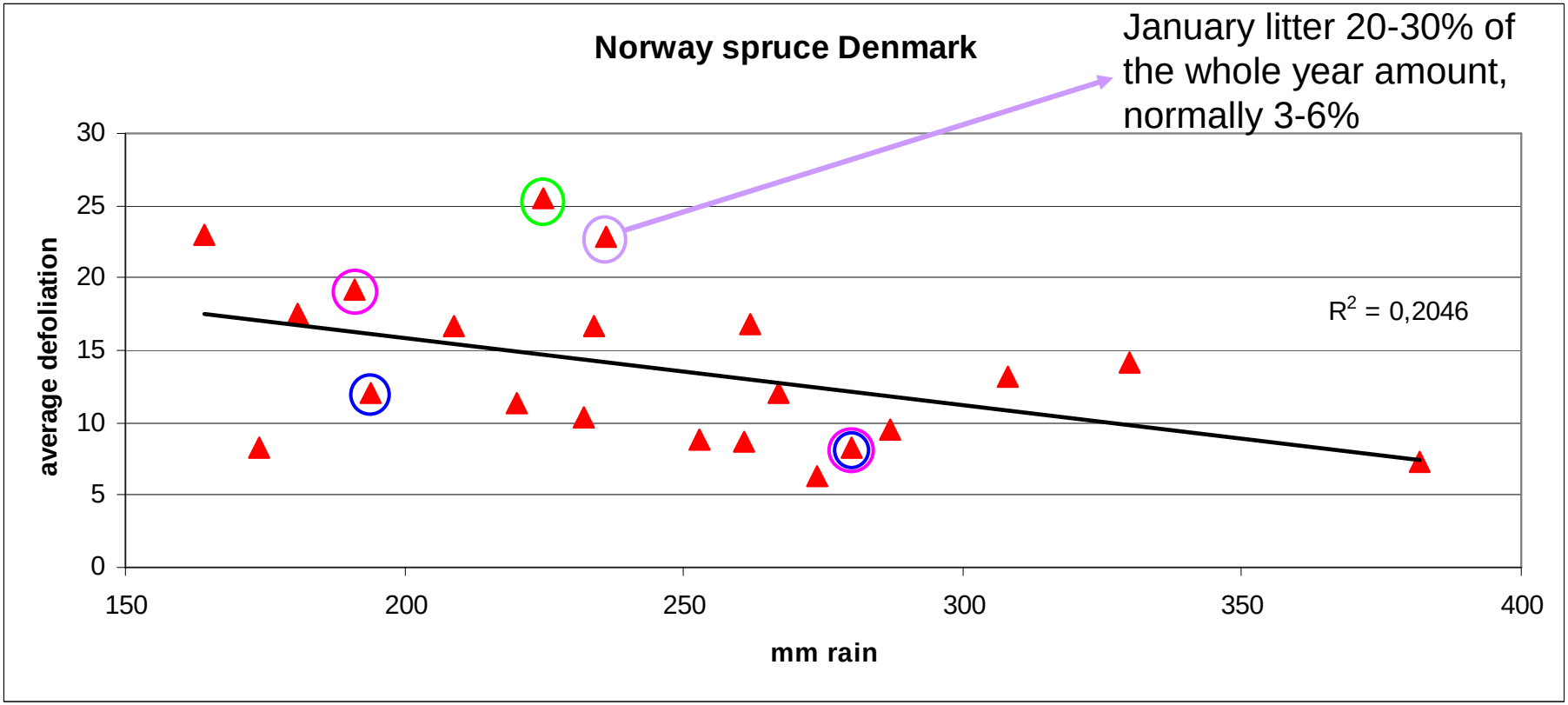


# Precipitation and defoliation

○ = January storm causing shoot damage and needle loss




○ = severe attacks of *Ips typographus* bark beetles

○ = severe windthrow in the winter before

○ = attacks of *Elatobium abietinum* green spruce aphid the year before

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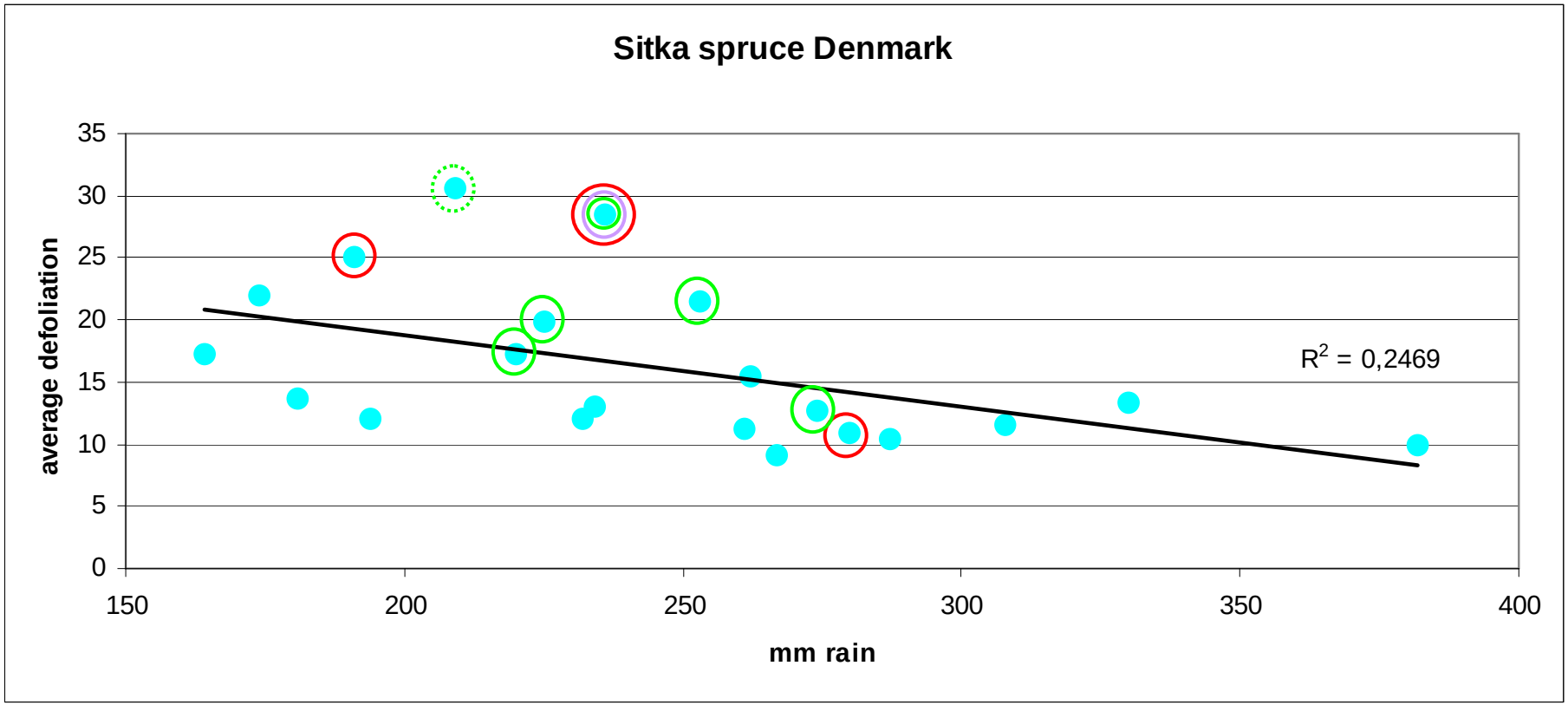
FACULTY OF LIFE SCIENCES
UNIVERSITY OF COPENHAGEN

# Precipitation and defoliation




○ = severe attacks of *Elatobium abietinum* green spruce aphid the year before

○ = heavy fruiting

○ = January storm causing shoot damage and needle loss

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*E. abietinum*

*D. micans*

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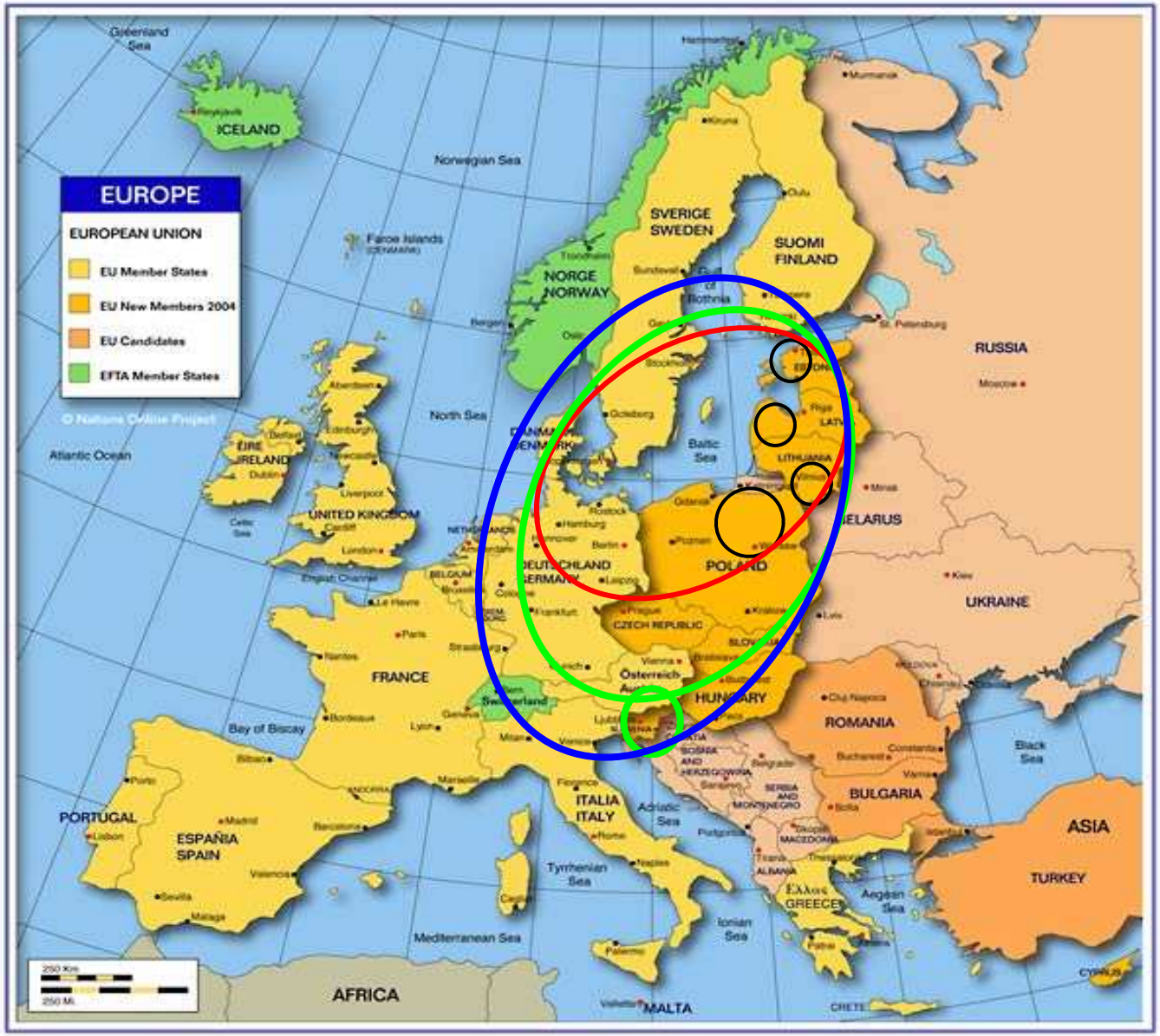
# Ash dieback



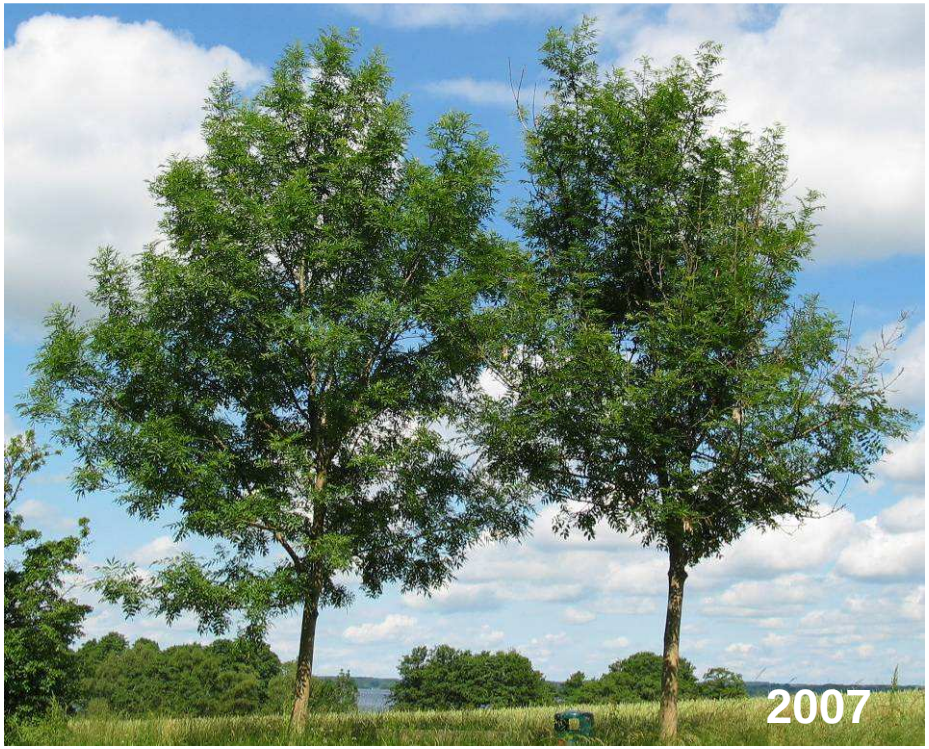

1990'ies:
Poland, Lithuania

2000:
Estonia, Latvia

2002-03:
Germany, Sweden, Denmark

2004-2006:
Austria, Czech Republic Slovakia, Slovenia

2007-2008:
Finland, Hungary, Italy, Norway, Rumania Switzerland, East France



Cause

- *Chalara fraxinea*
- = *Hymenoschyphus albidus*

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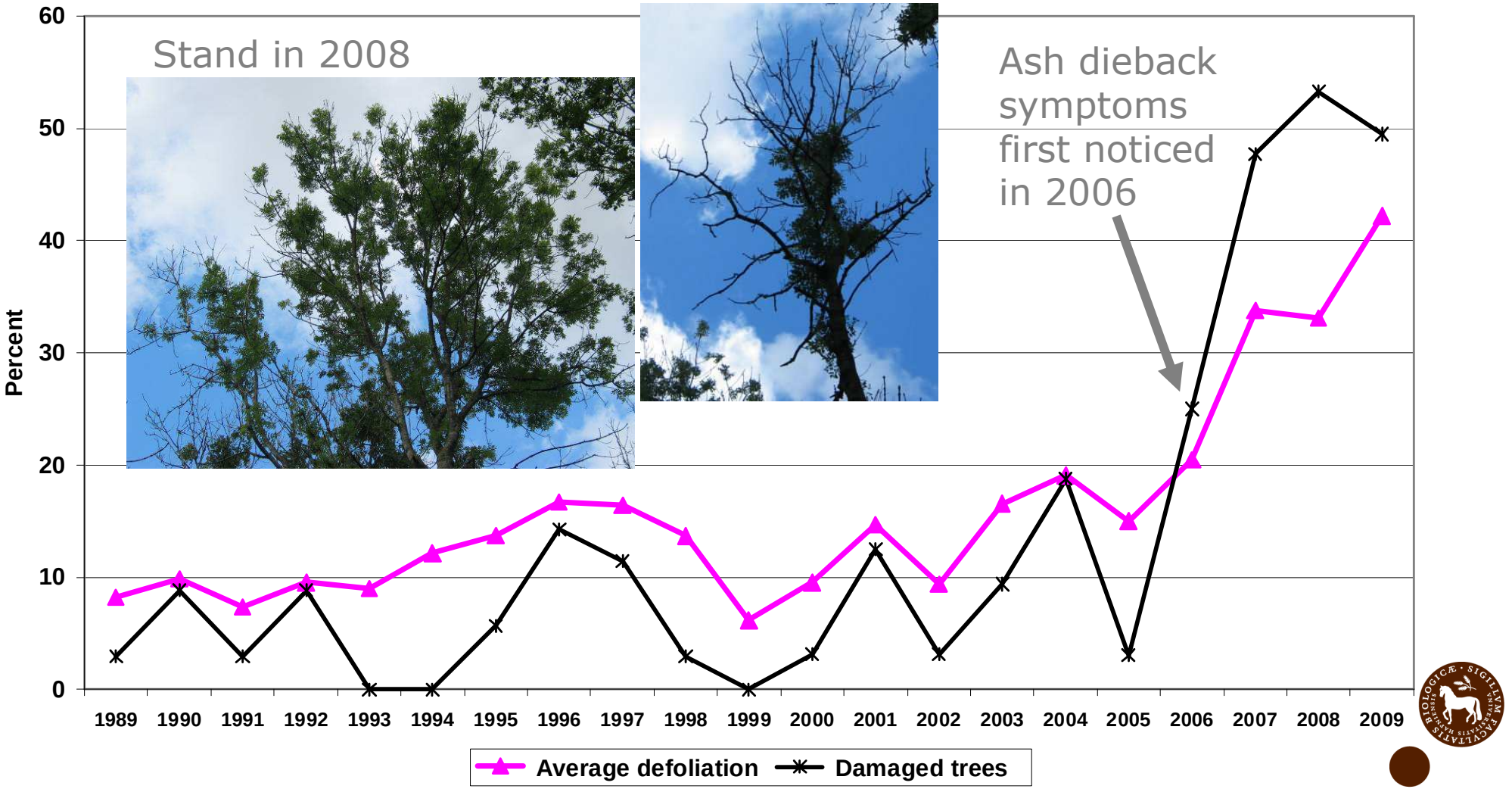
# Ash decline


Stand in 2008
Ash dieback symptoms first noticed in 2006
Percent
60
50
40
30
20
10
0
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Average defoliation
Damaged trees

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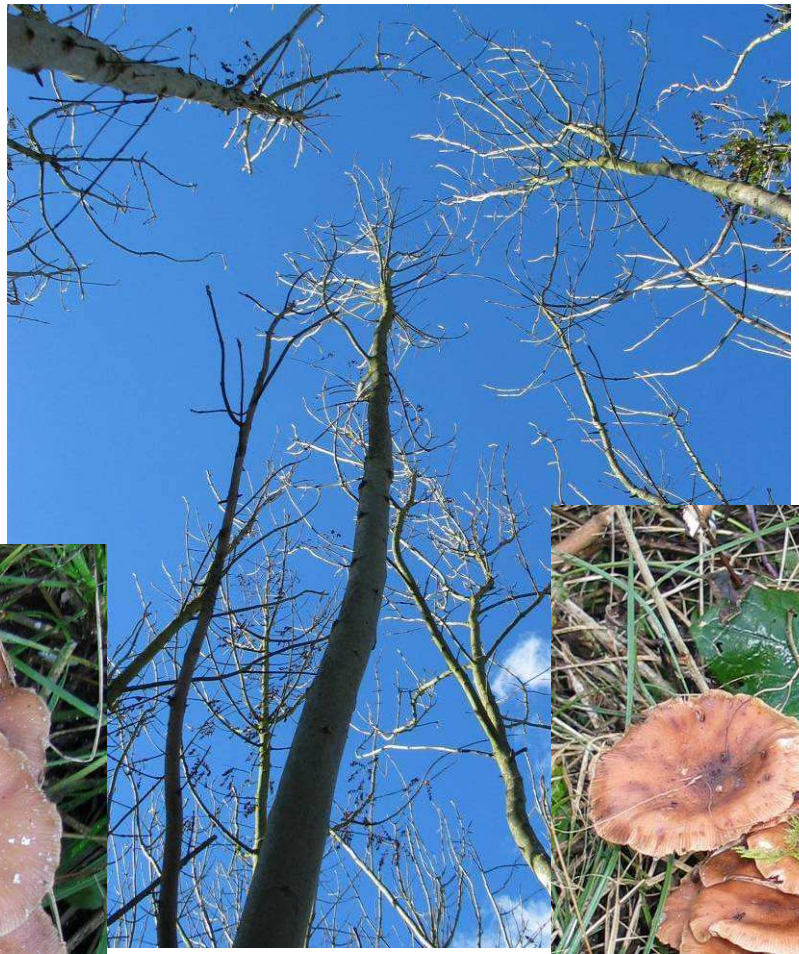
# Honey fungus (*Armillaria* sp.) often kills trees



# Conclusions

- **Beech** impacted by summer precipitation and mast
- **Oak** impacted by defoliators and severe drought
- **Sitka** spruce impacted by aphids and Micans

Can we use growth rings, soil water and litter fall to verify ?

- **Spruce** impacted by wind throw and bark beetles

= removal of stands. How do we document this ?

- **Ash** impacted by new disease (*Chalara fraxinea*)

Can we follow spread / consequences via FutMon ?

# Would you like to contribute ?

- Send me a mail: imt@life.ku.dk
- Which tree species ?
- Which data ?
- Comments or ideas more than welcome.

Thank you for your attention !