



**FORESTS' FUTURE 2021**

**Consequences of Bark Beetle Calamity for the Future of Forestry in Central Europe**

Two days on-line meeting March 23<sup>rd</sup> – 24<sup>th</sup>

# **Spruce bark beetle attacks in the forests of Romania managed by the forest state administration between 2015 and 2020**

**Mihai-Leonard DUDUMAN<sup>1</sup>, Nicolai OLENICI<sup>2</sup>, Constantin NEȚOIU<sup>3</sup>**

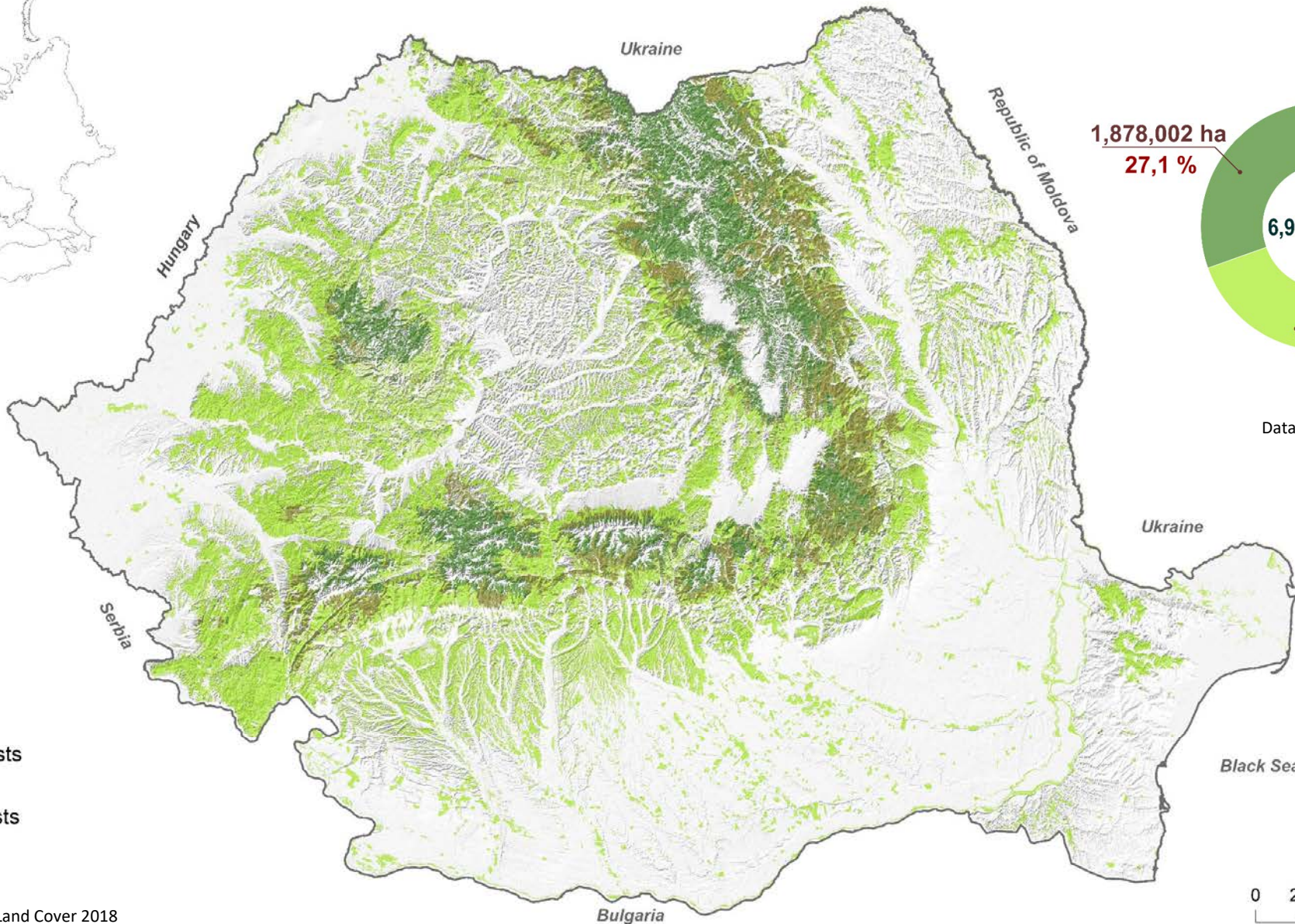
- 1) "Ștefan cel Mare" University of Suceava, Forestry Faculty, Applied Ecology Lab., Suceava, Romania
- 2) National Institute for Research and Development in Forestry, "Marin Drăcea", Campulung Moldovenesc Station, Câmpulung Moldovenesc, Romania
- 3) National Institute for Research and Development in Forestry, "Marin Drăcea", Craiova Station, Craiova, Romania

Europe map

# Romania forests



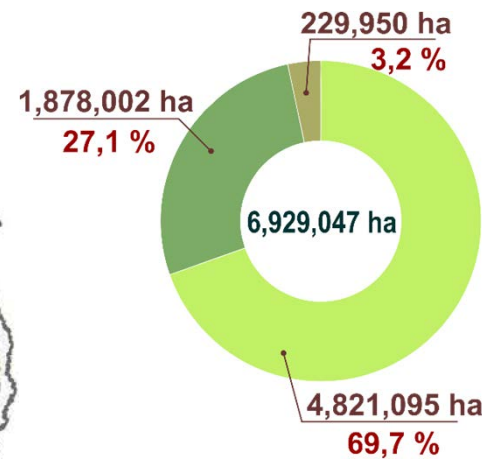
0 1.000 2.000 Km



## Legend

### Forest areas

- Coniferous forests
- Mixed forests
- Deciduous forests



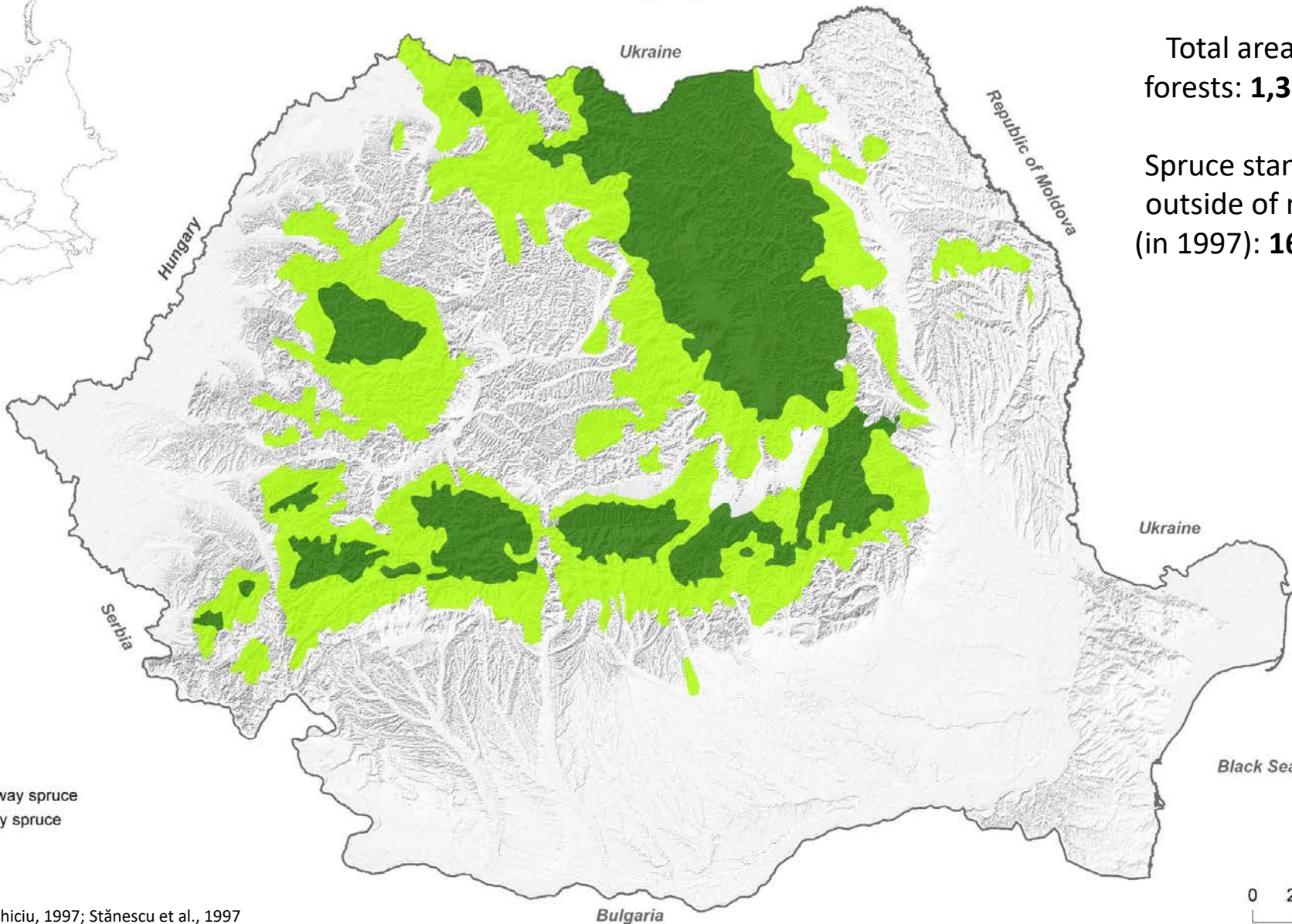
Data source: <http://roifn.ro/>



Europe map

# Area of Norway spruce

0 1.000 2.000 Km



Total area of spruce forests: **1,372,325 ha\***;

Spruce stands installed outside of natural area (in 1997): **163,952 ha\*\***.

\* ) <http://roifn.ro/>

\*\* ) Drăghiciu, 1997

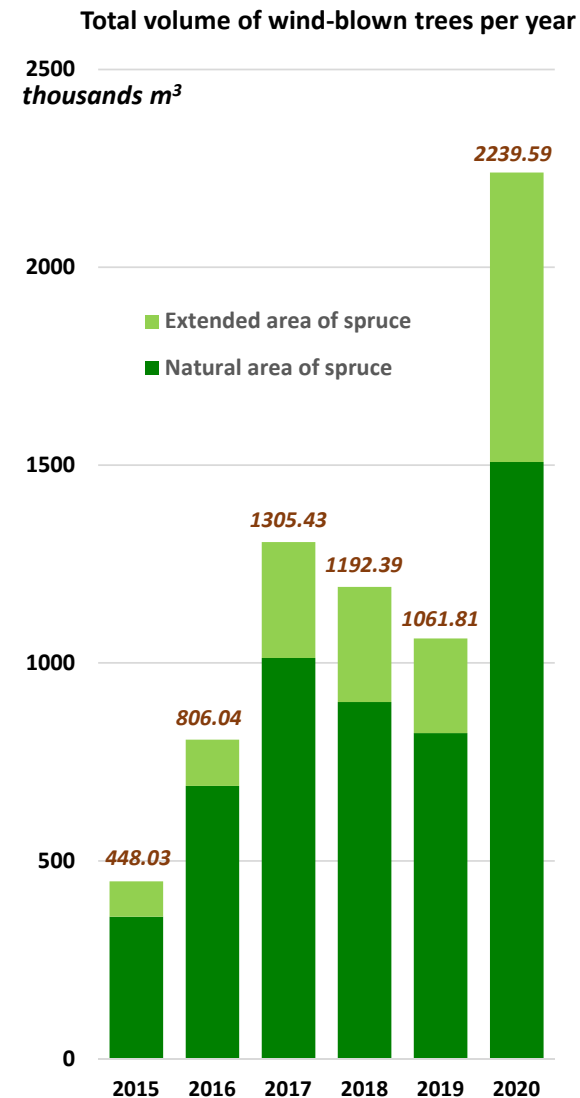
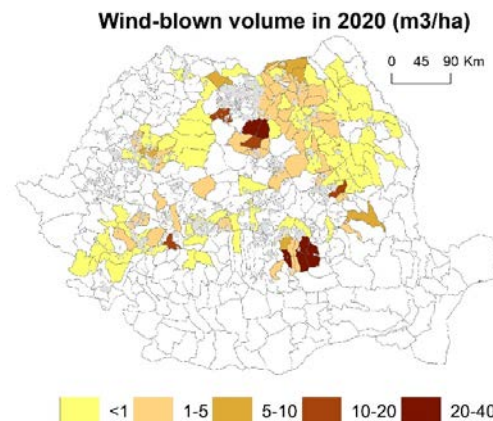
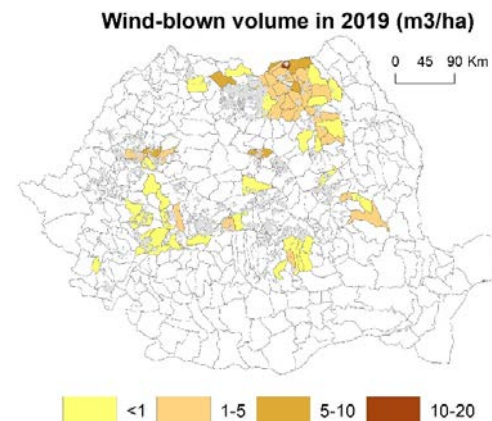
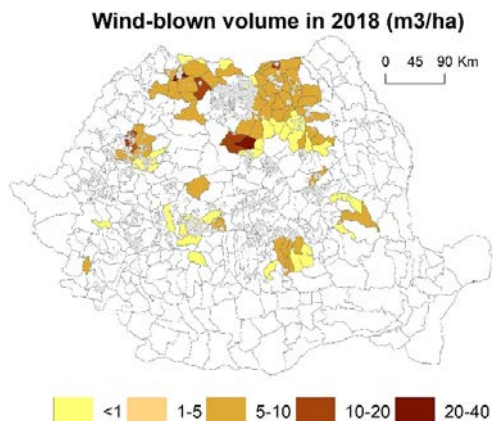
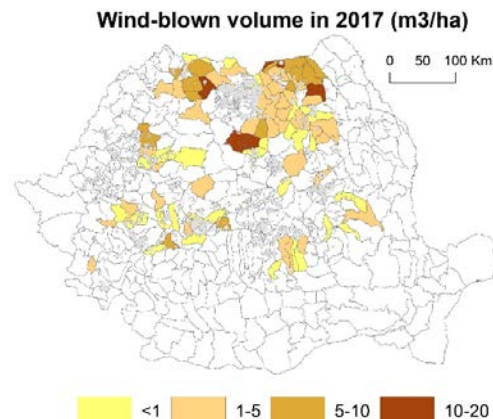
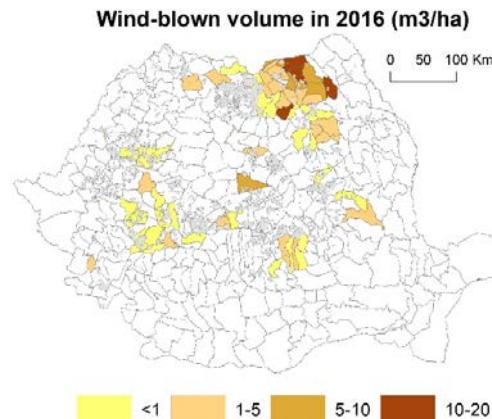
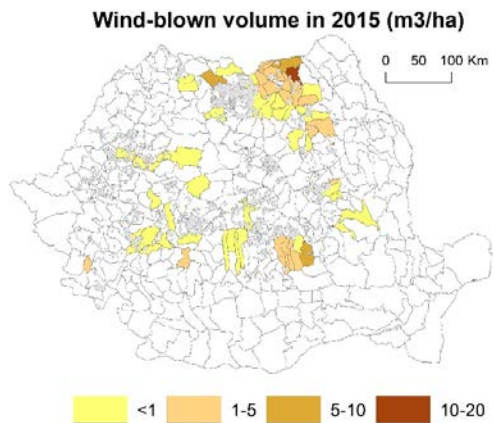
## Legend

- Extended area of Norway spruce
- Natural area of Norway spruce

0 25 50 100 Km

# Favoring factors for spruce bark beetle attacks in the forests of Romania: **Wind-blown trees**

## Volume of wind-blown trees recorded in spruce stands between 2015-2020





**Favoring factors for spruce bark beetle attacks in the forests of Romania: **Extreme droughts****

**Severe debilitated spruce stands especially in hilly areas (spruce stands situated in extended area of spruce)**





# Principal bark beetle species which cause significant damages in the spruce forests of Romania:

## In spruce forests situated in natural area:

- *Ips typographus* (predominant);
- *Ips duplicatus*;
- *Ips amitinus*;
- *Pityogenes chalcographus*;

## In spruce forests situated in extended area:

- *Ips typographus* (predominant);
- *Ips duplicatus* (predominant especially in eastern Romania);
- *Pityogenes chalcographus*;
- *Polygraphus poligraphus*





## Romanian forests

0 50 100 Km

Coniferous Mixed Deciduous

# Spruce bark beetle attacks in 2015

## Wind-blown volume in 2015 (m3/ha)

0 50 100 Km

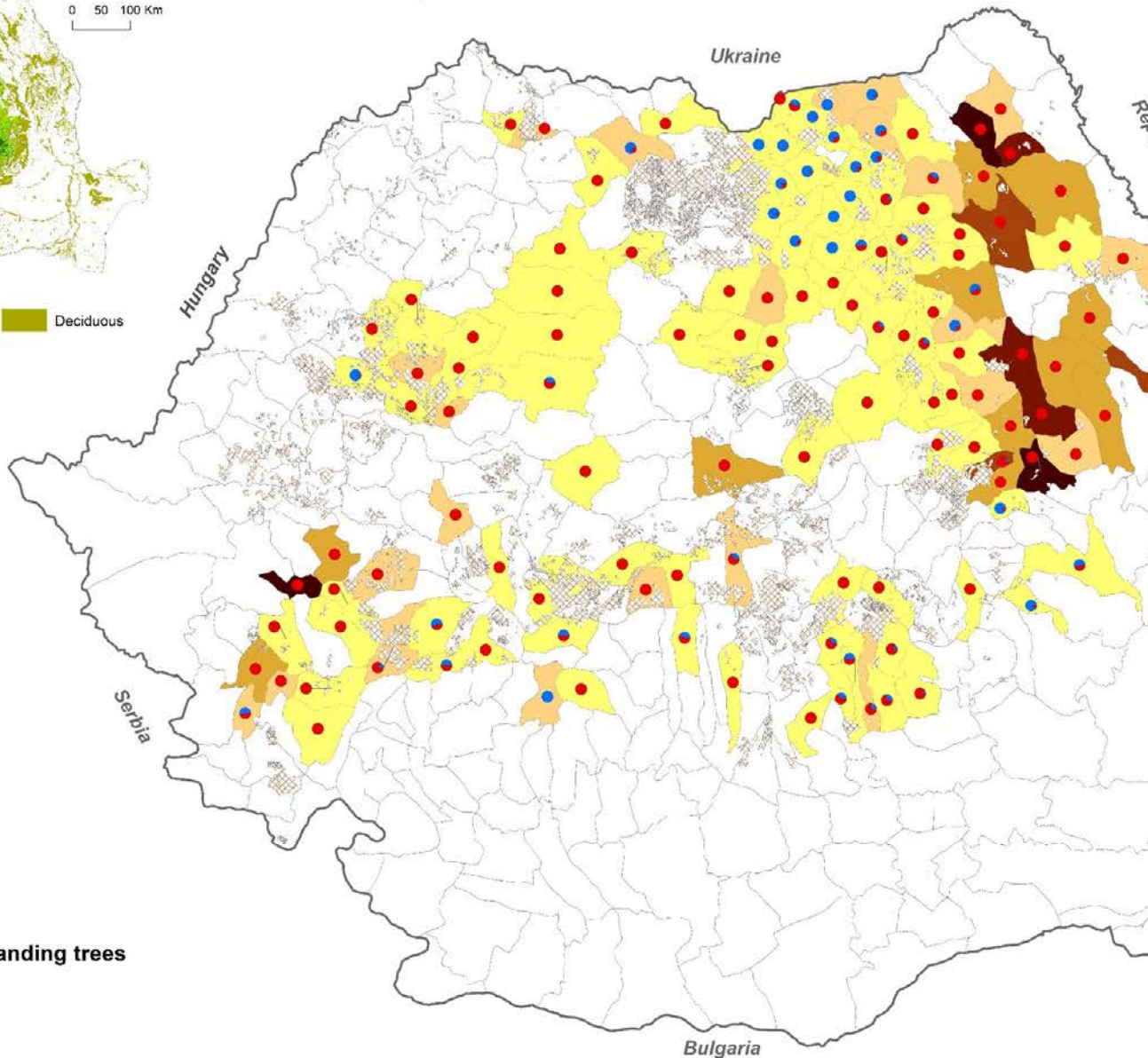
### Legend

other forest administrations  
infested volume (m3/ha)

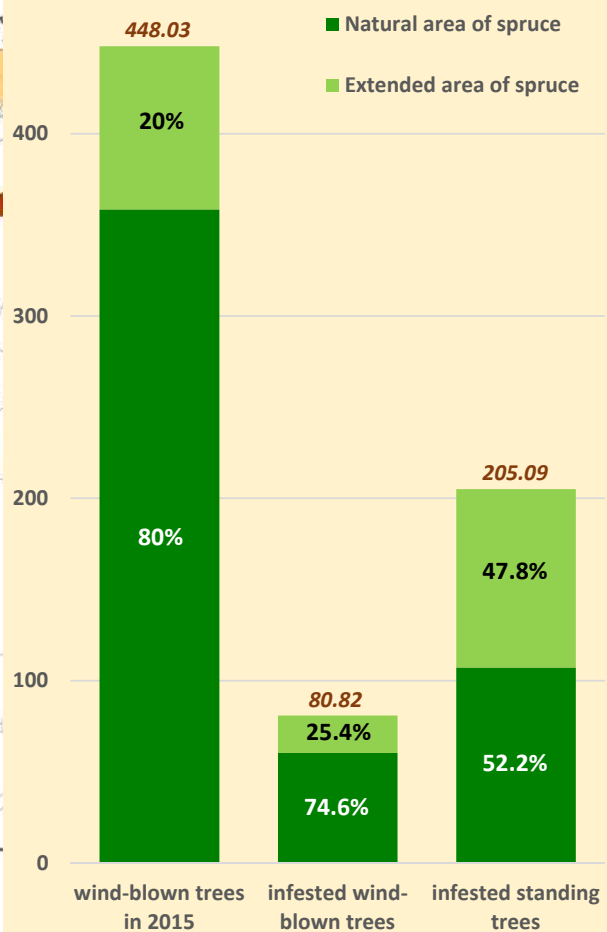
<1  
1-5  
5-10  
10-20  
20-40  
>40

infested wind-blown / standing trees

wind-blown trees  
standing trees



Volume of wind-blown and infested trees (*thousands m<sup>3</sup>*)



# Spruce bark beetle attacks in 2016

Romanian forests

0 50 100 Km

Coniferous Mixed Deciduous

## Legend

other forest administrations

infested volume (m<sup>3</sup>/ha)

<1  
1-5  
5-10  
10-20  
>20

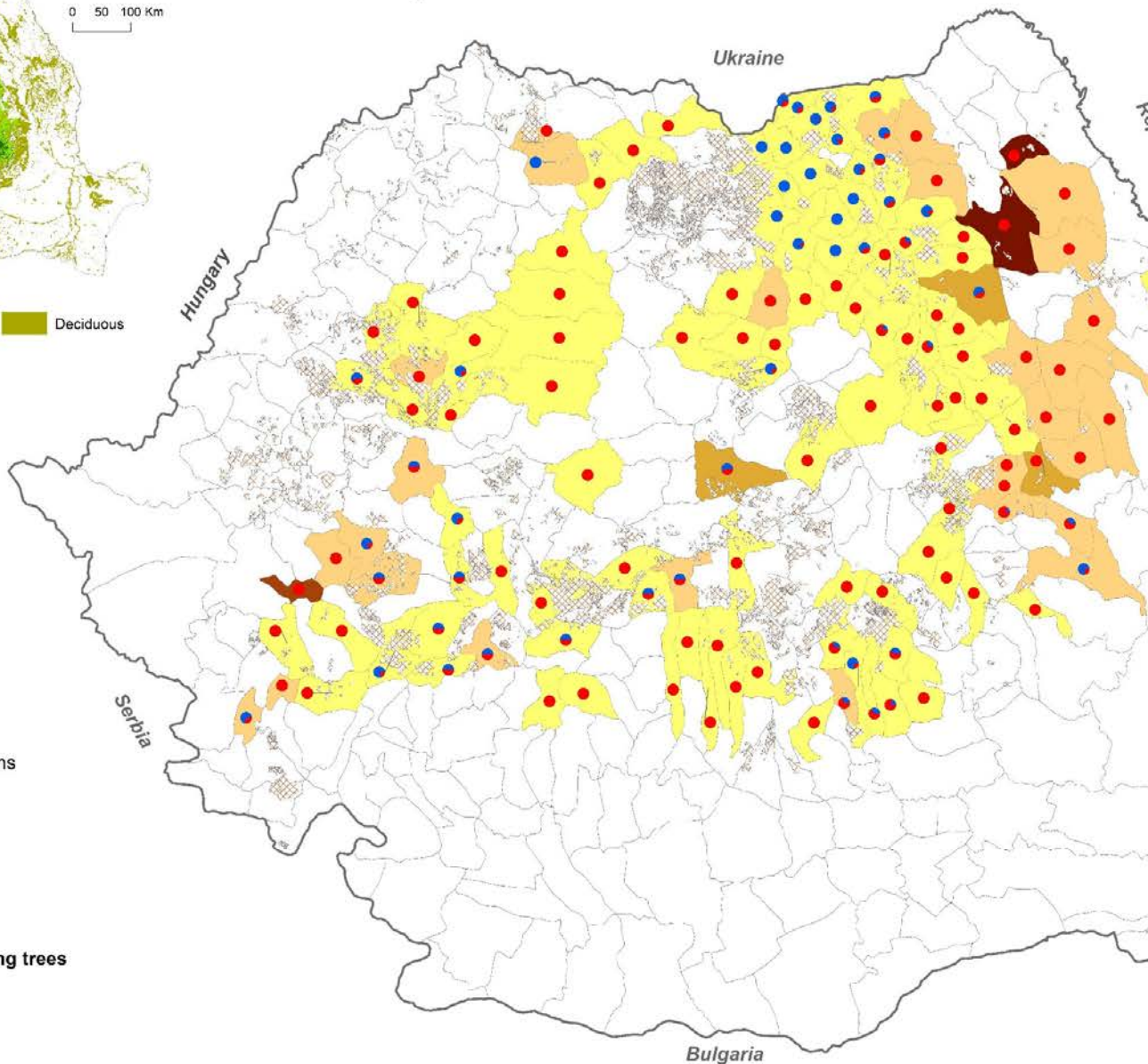
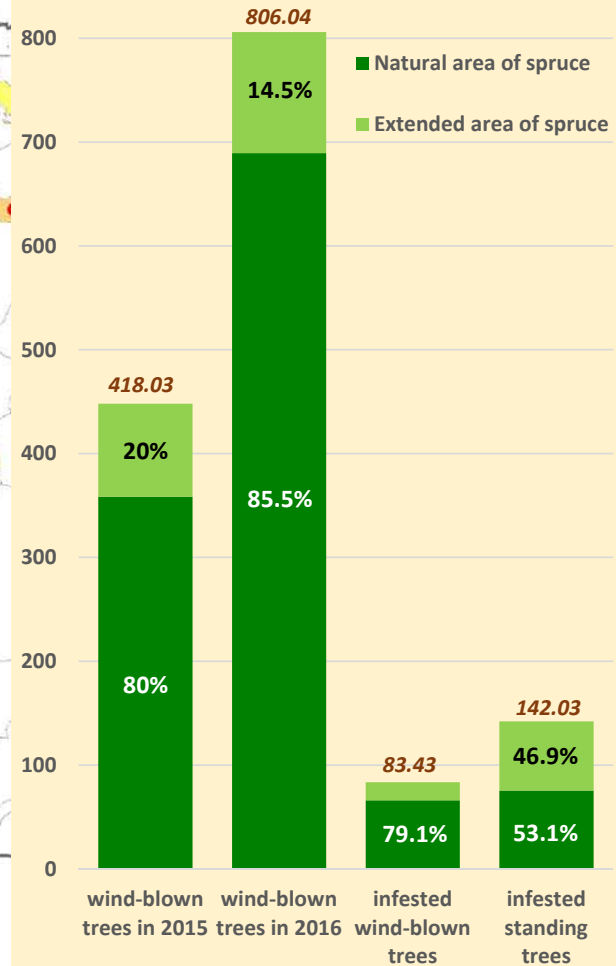
infested wind-blown / standing trees

wind-blown trees  
standing trees

Wind-blown volume in 2015 (m<sup>3</sup>/ha)

0 50 100 Km

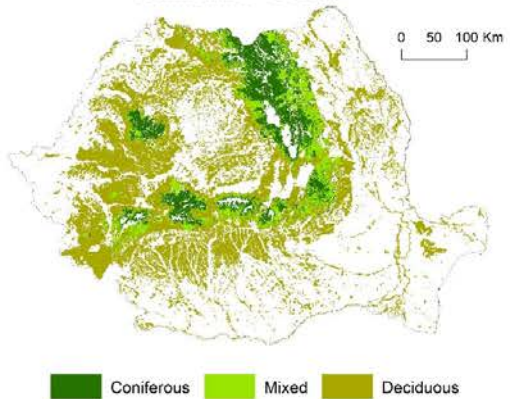
Volume of wind-blown and infested trees (thousands m<sup>3</sup>)



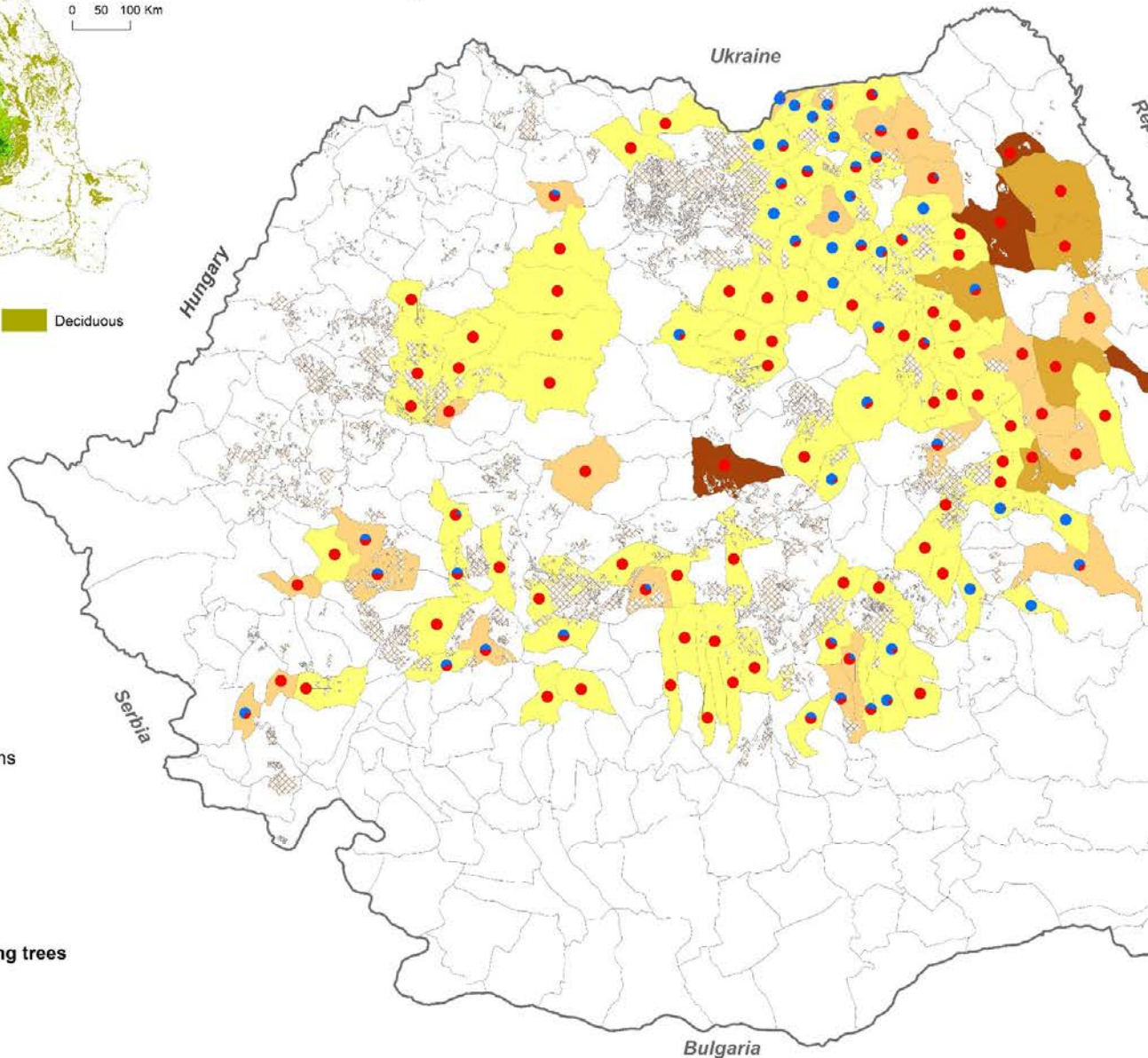
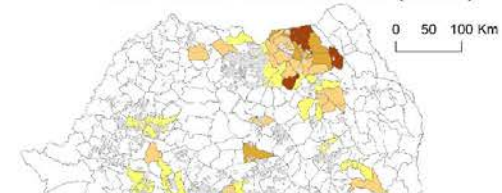


# Spruce bark beetle attacks in 2017

Romanian forests

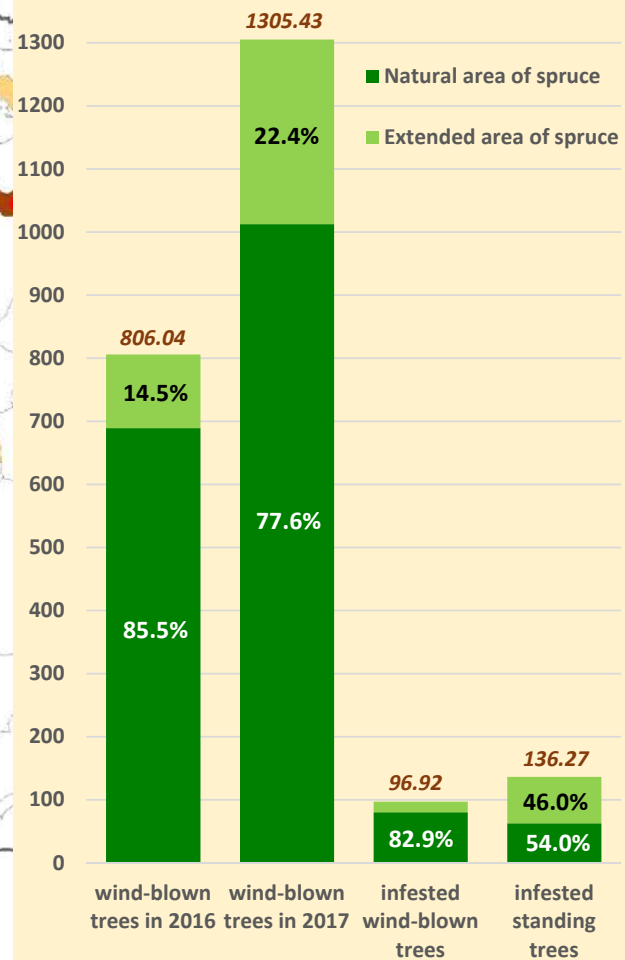


Wind-blown volume in 2016 (m3/ha)



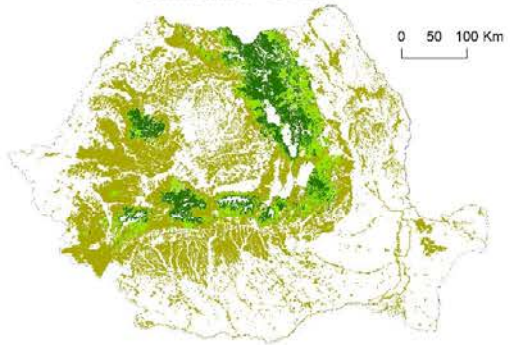
- Legend**
- other forest administrations
  - infested volume (m3/ha)**
  - <1
  - 1-5
  - 5-10
  - 10-20
  - 20-40
  - infested wind-blown / standing trees**
  - wind-blown trees
  - standing trees

Volume of wind-blown and infested trees (*thousands m<sup>3</sup>*)



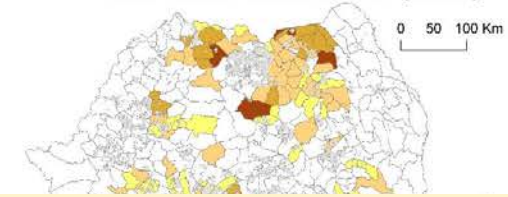
# Spruce bark beetle attacks in 2018

## Romanian forests

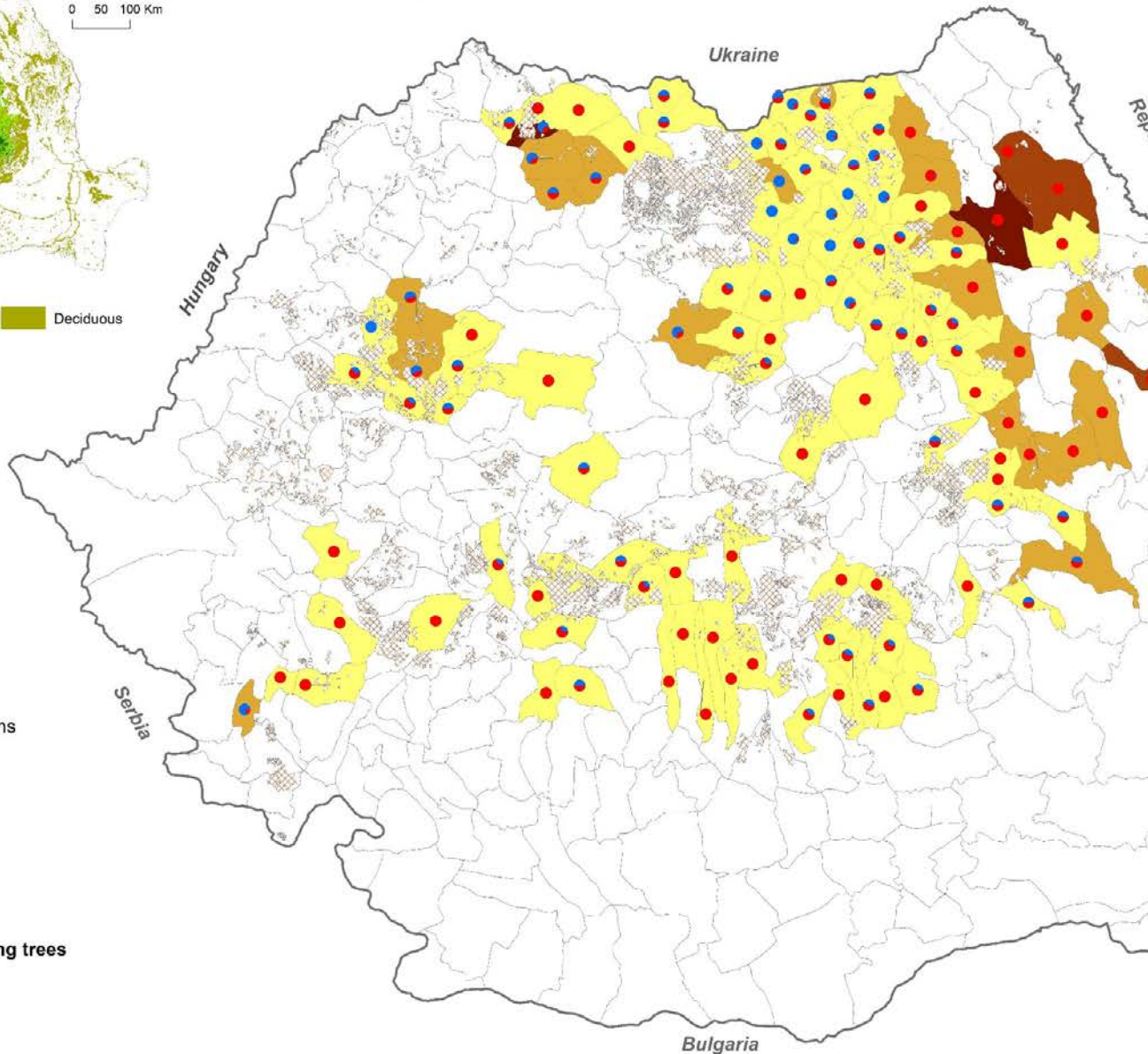


Coniferous Mixed Deciduous

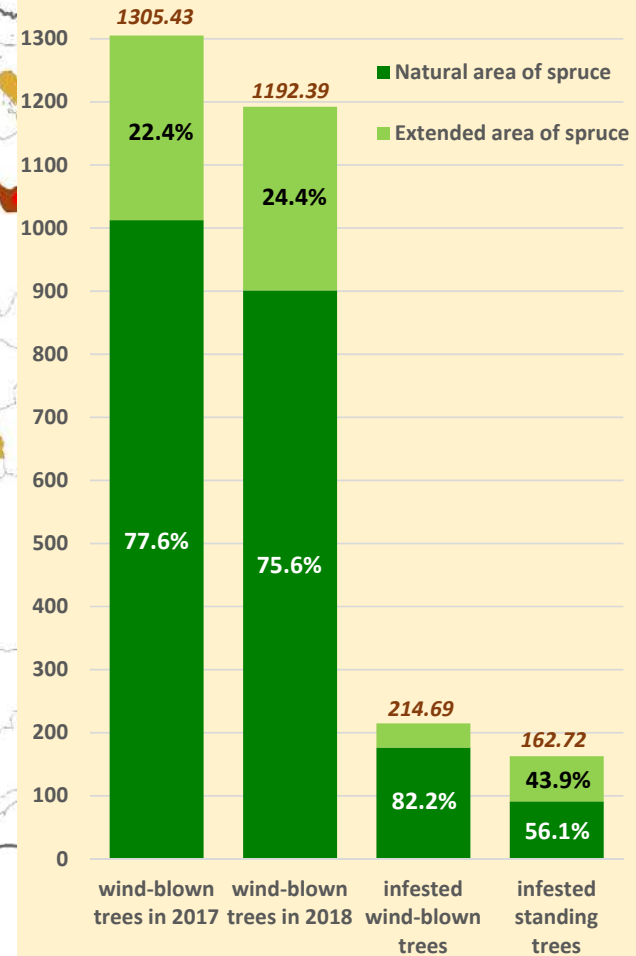
## Wind-blown volume in 2017 (m<sup>3</sup>/ha)



- Legend**
- other forest administrations
  - infested volume (m<sup>3</sup>/ha)**
    - <1
    - 1-5
    - 5-10
    - 10-20
    - 20-40
    - >40
  - infested wind-blown / standing trees**
    - wind-blown trees
    - standing trees



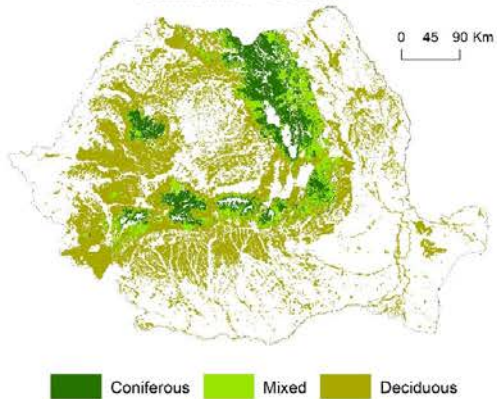
## Volume of wind-blown and infested trees (thousands m<sup>3</sup>)



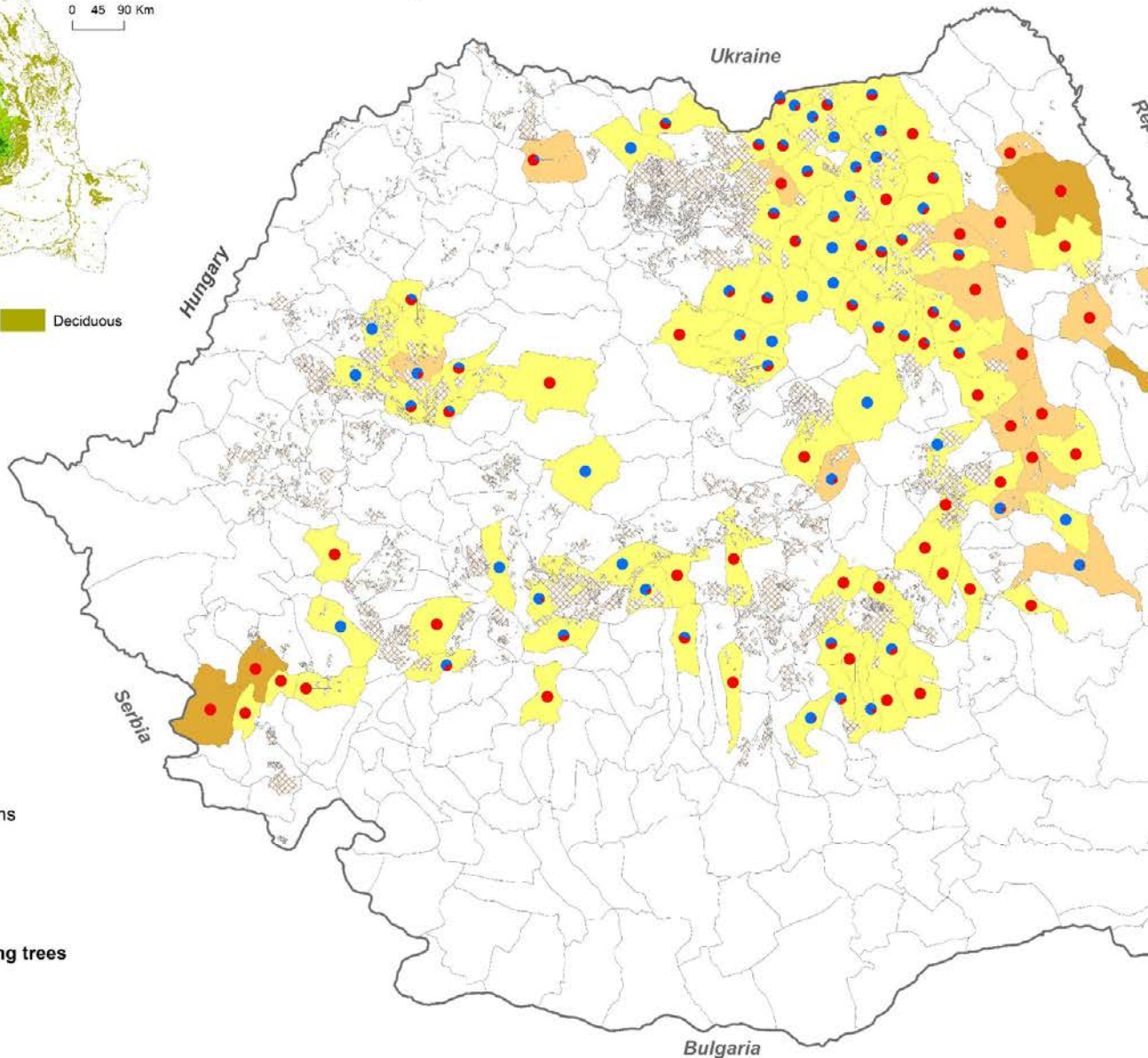
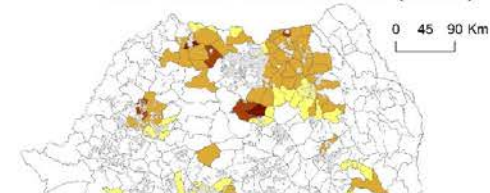


# Spruce bark beetle attacks in 2019

Romanian forests

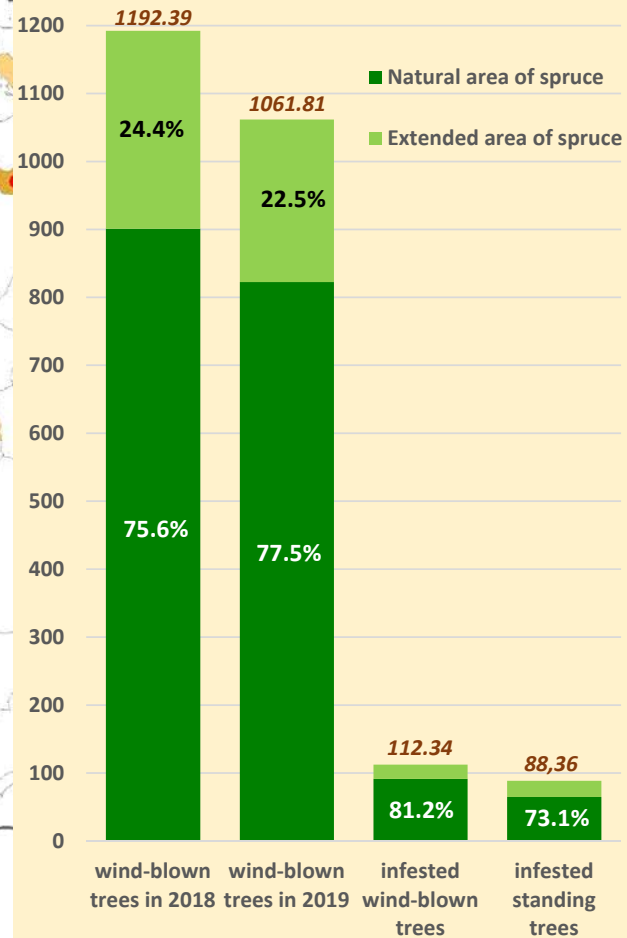


Wind-blown volume in 2018 (m3/ha)



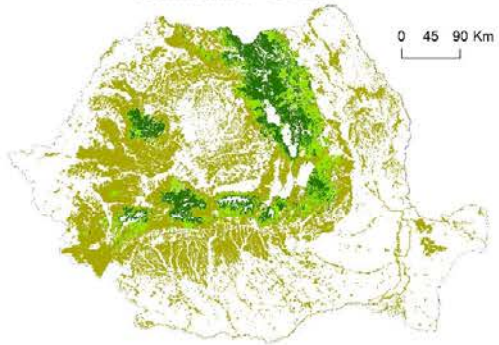
- Legend**
- other forest administrations
  - infested volume (m3/ha)**
  - <1
  - 1-5
  - 5-10
  - infested wind-blown / standing trees**
  - wind-blown trees
  - standing trees

Volume of wind-blown and infested trees (*thousands m<sup>3</sup>*)



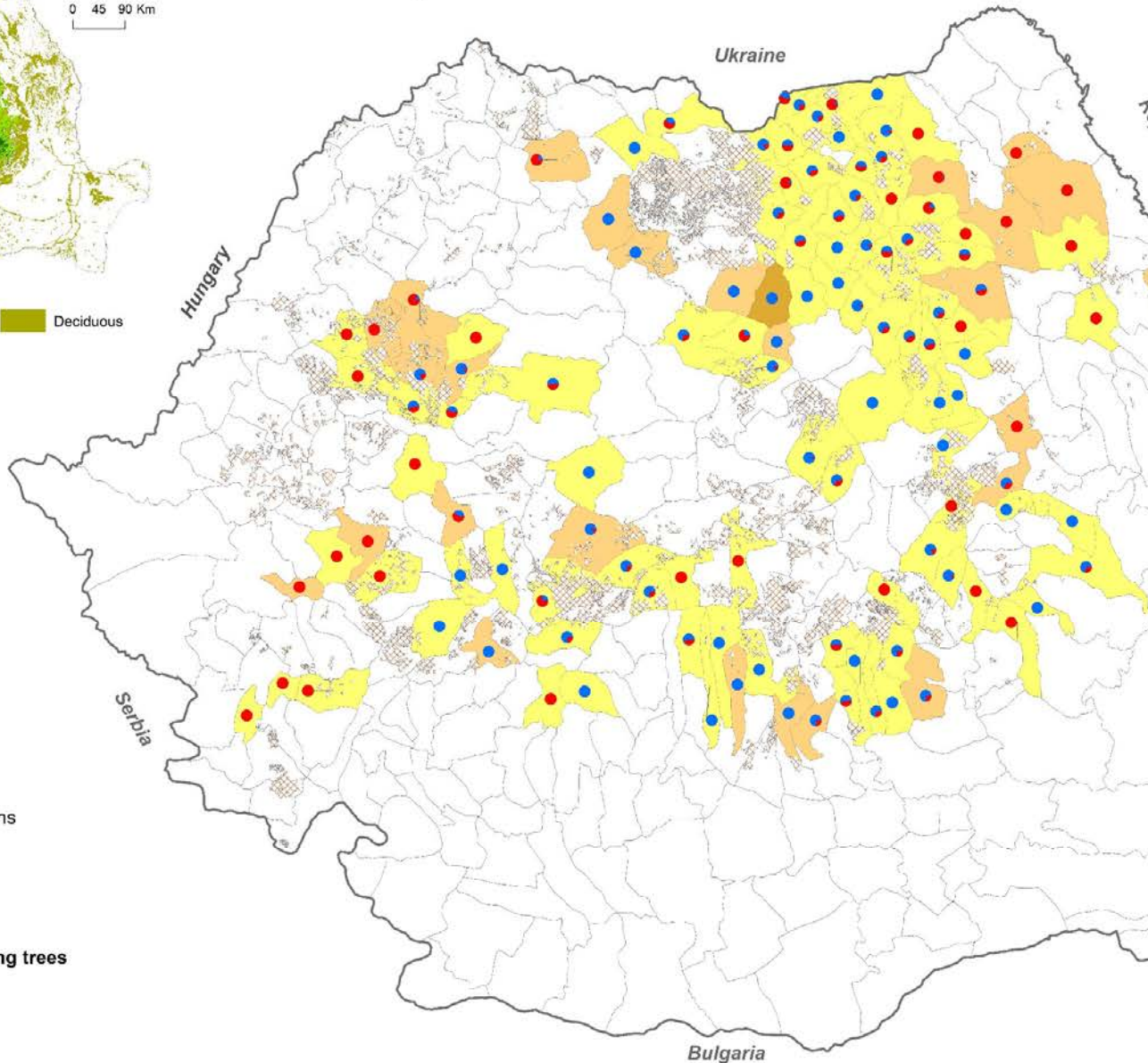
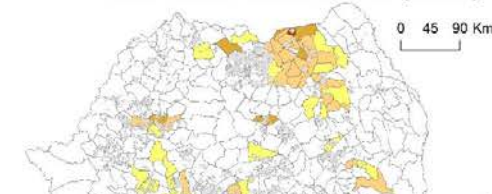
# Spruce bark beetle attacks in 2020

Romanian forests



Coniferous Mixed Deciduous

Wind-blown volume in 2019 (m3/ha)



## Legend

other forest administrations

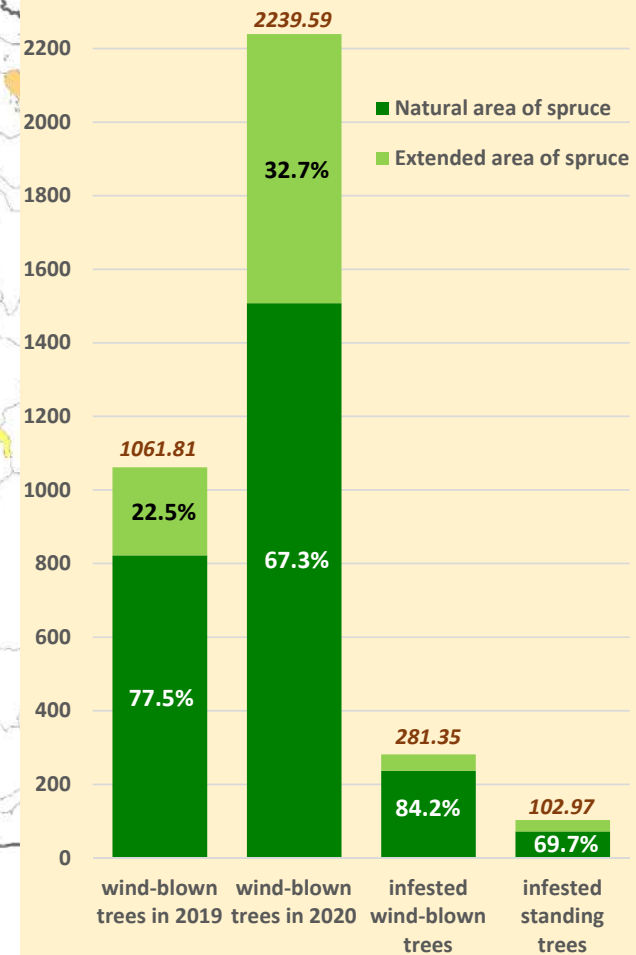
infested volume (m3/ha)

<1  
1-5  
5-10

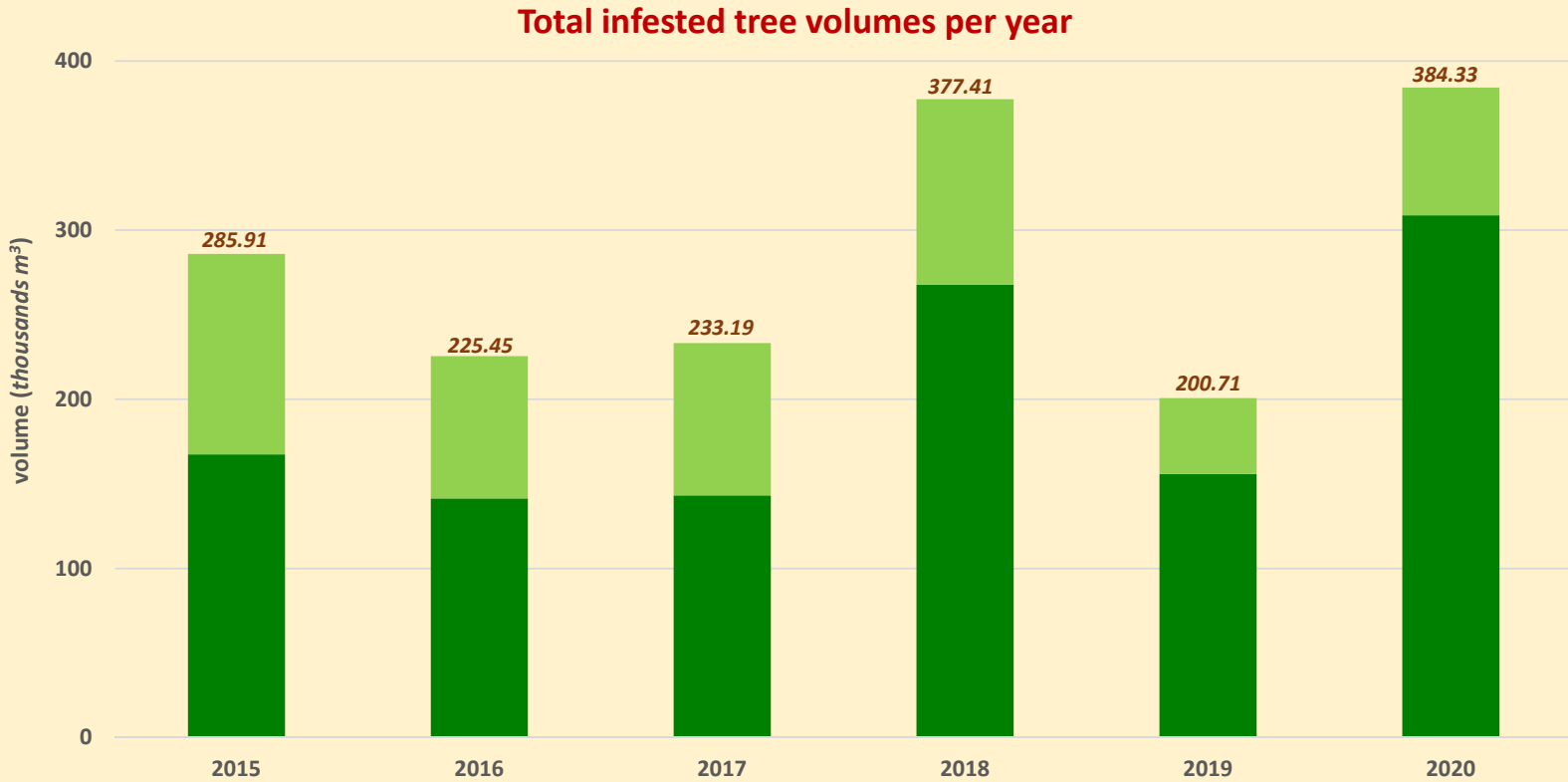
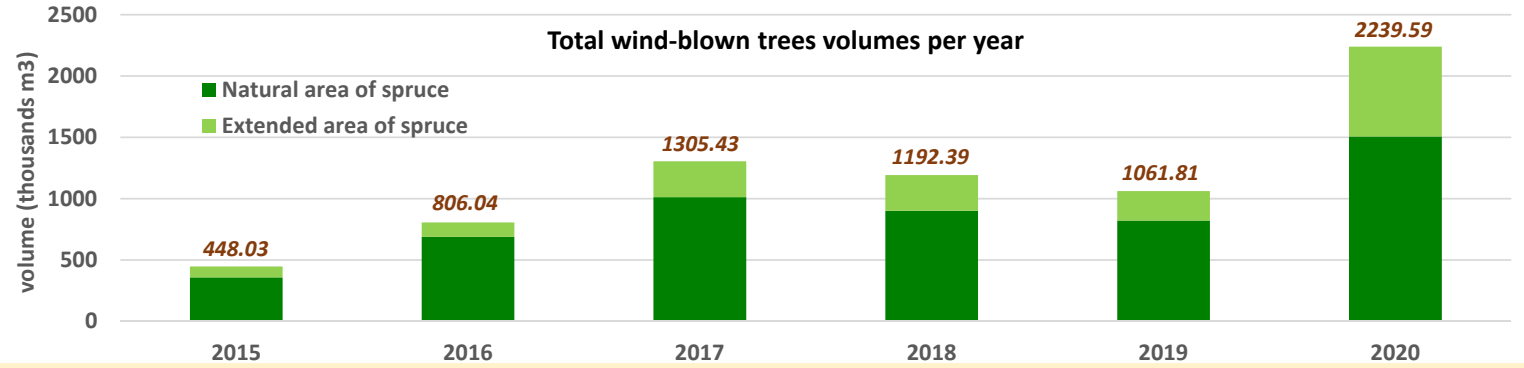
infested wind-blown / standing trees

wind-blown trees  
standing trees

Volume of wind-blown and infested trees (thousands m<sup>3</sup>)

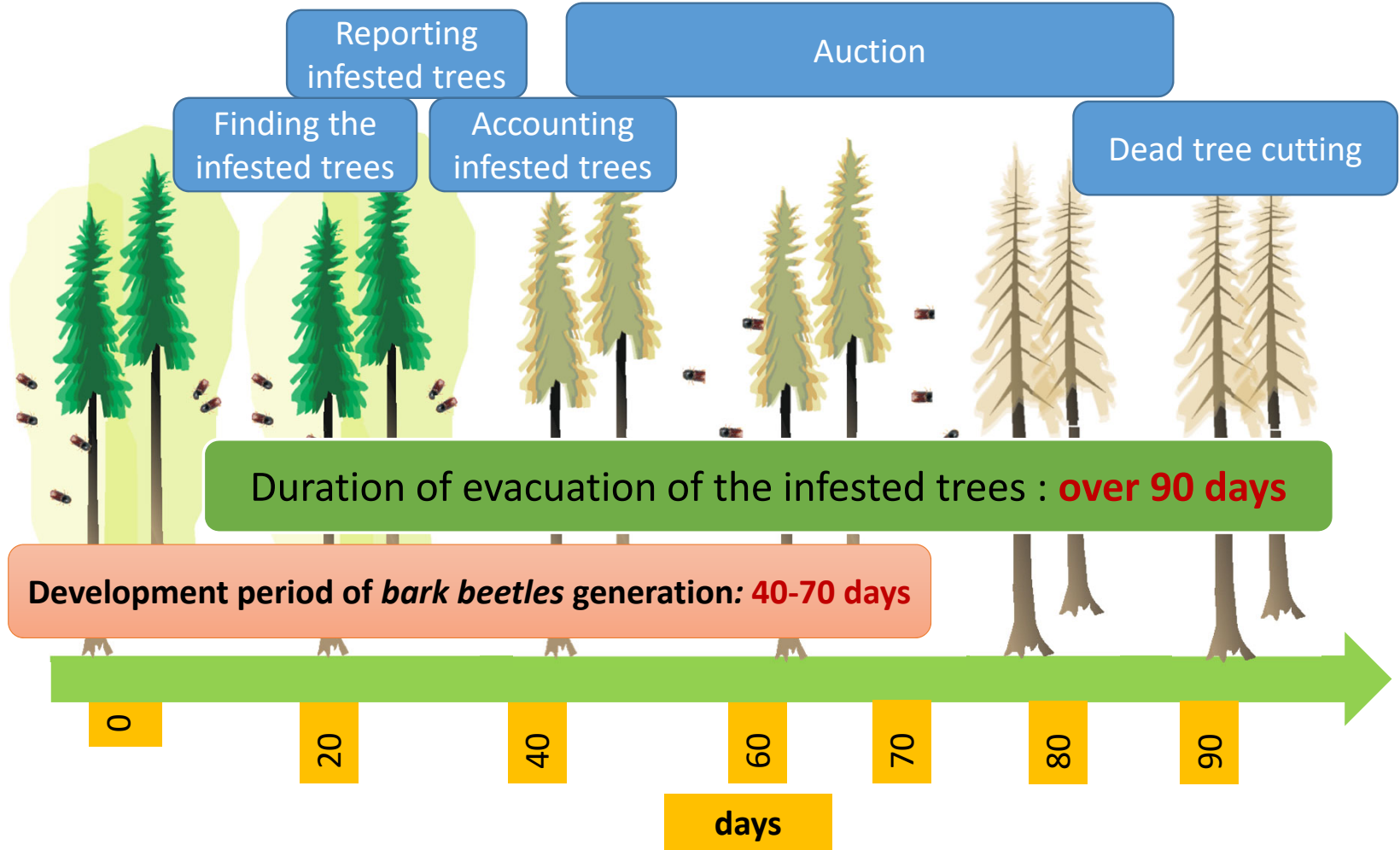








# Infested trees' management in Romania





# Bark beetle monitoring

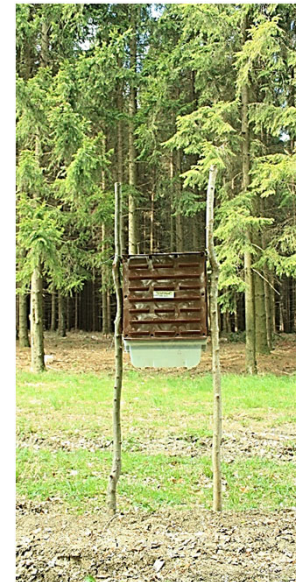
Trap trees

Three series per year

- Isolated wind-blown trees
- Artificially felled trees

Feromonal traps

- Intercept<sup>®</sup> traps or Theysohn<sup>®</sup> traps
- Synthetic lures for *I. typographus*, *I. duplicatus*, *P. chalcographus*



# Conclusion about the spruce bark beetle attacks in the forests of Romania

(managed by the forest state administration)

- Favoring factors of spruce bark beetle attacks: wind-blown trees and extreme droughts;
- Between 2015-2020:
  - wind-blown trees: 448.03 - 2239.59 thousands m<sup>3</sup>;
  - wind-blown infested trees: 80.82 – 281.35 thousands m<sup>3</sup>;
  - standing infested trees: 88.36 – 205.09 thousands m<sup>3</sup>;
  - total infested trees: 200.81 – 384.33 thousands m<sup>3</sup>;
- Principal problem of infested trees' management: duration of evacuation of infested trees is very long. This protective measure is frequently inefficient.
- In Romania we not have a bark beetle calamity, but we have an important problems due to the attacks of this pests.







## FORESTS' FUTURE 2021

### Consequences of Bark Beetle Calamity for the Future of Forestry in Central Europe

Two days on-line meeting March 23<sup>rd</sup> – 24<sup>th</sup>

Thank you for  
your attention!

