Latvia University
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Restoration of a sand mining site in Northern Latvia

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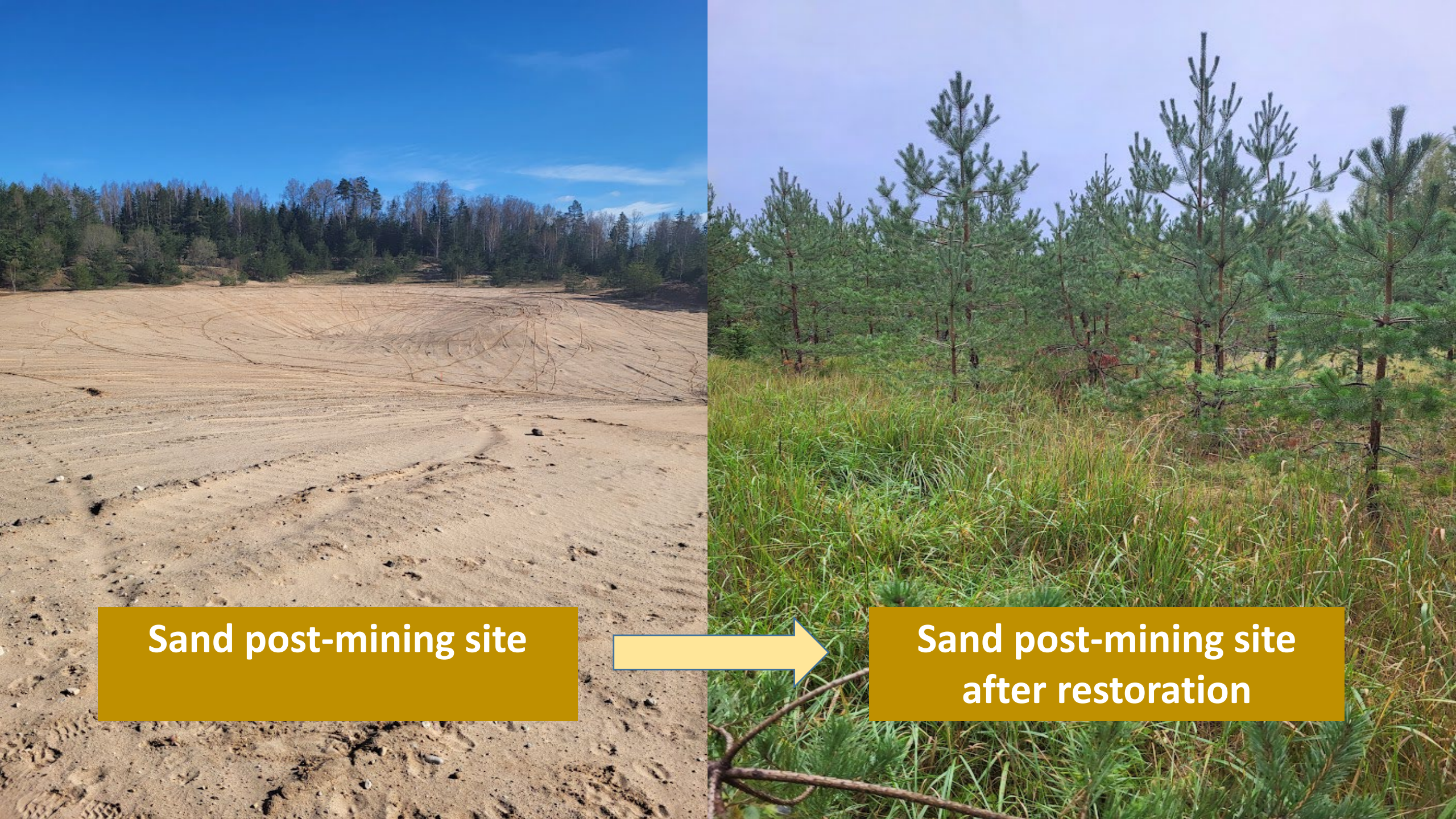
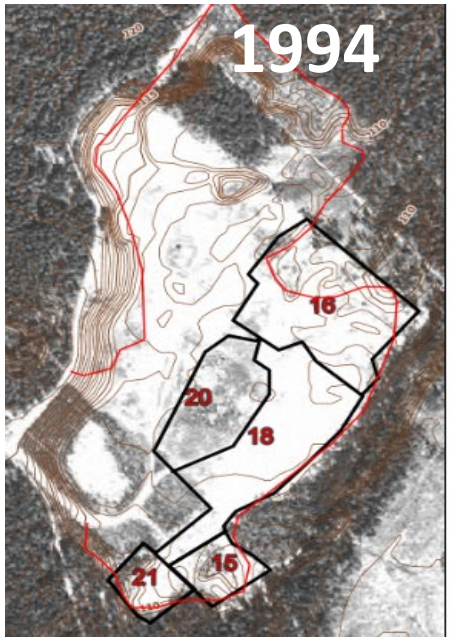

Sand post-mining site
Sand post-mining site after restoration

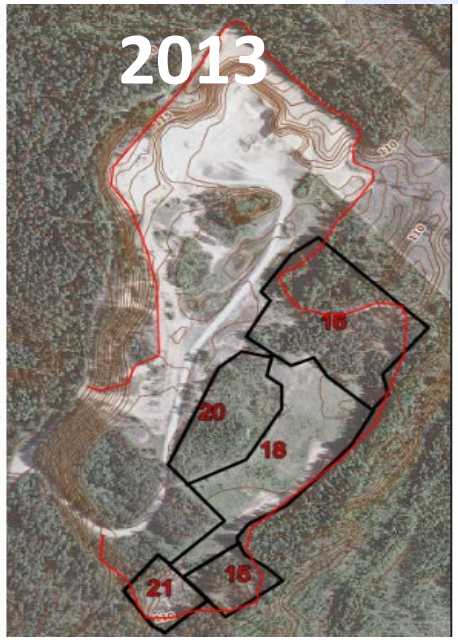
The aim

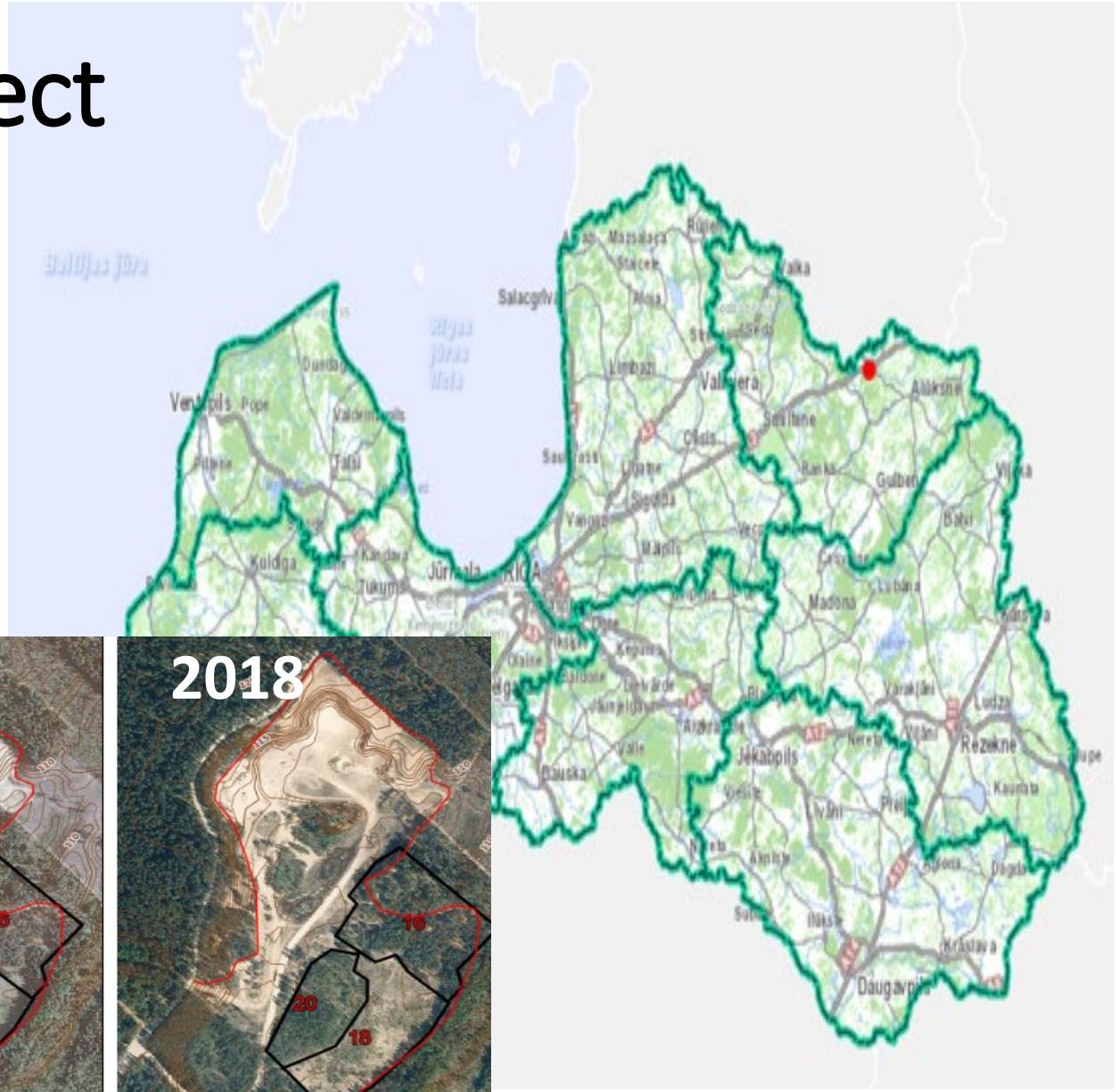
After the sand mining process, assess the natural restoration of the sand post-mining area located in the hemiboreal forest zone in Northern Latvia.

Characterization of the object

Natural recultivation (afforestation) in the quarry was gradually started in 1993.







The source of the image: LVM Geo

Materials and methods

Dendrometric data:

Year of recultivation	Stand age, in years	Area, ha	Number of sample plots in area	Area of one plot, m^2
1993	28	0,46	5	100
2002	19	2,02	9	50
2005	16	1,04	9	50
2006	15	0,44	5	100
2012	9	1,85	9	50

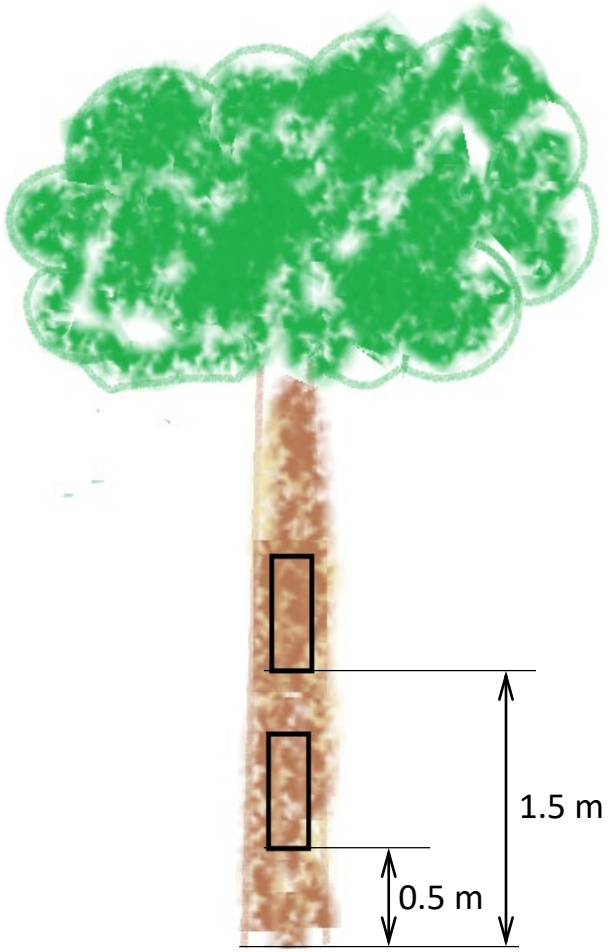
The tree species were determined, the tree height and diameter at breast height were measured.

Materials and methods

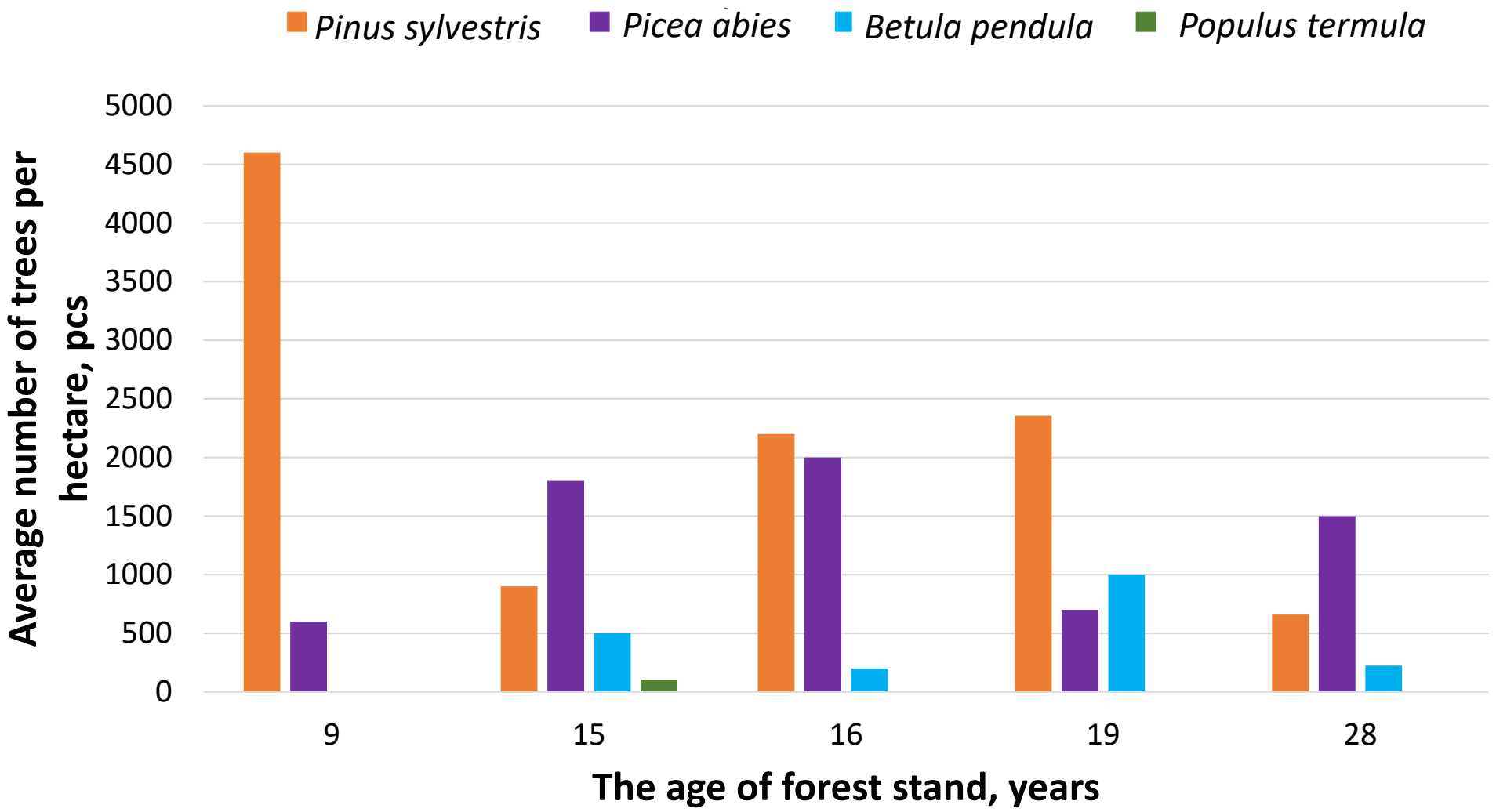
Lichen cover and species diversity :

- Three plots in each forest stand are selected, where 3 trees are freely chosen in each plot—total sample plots 15.

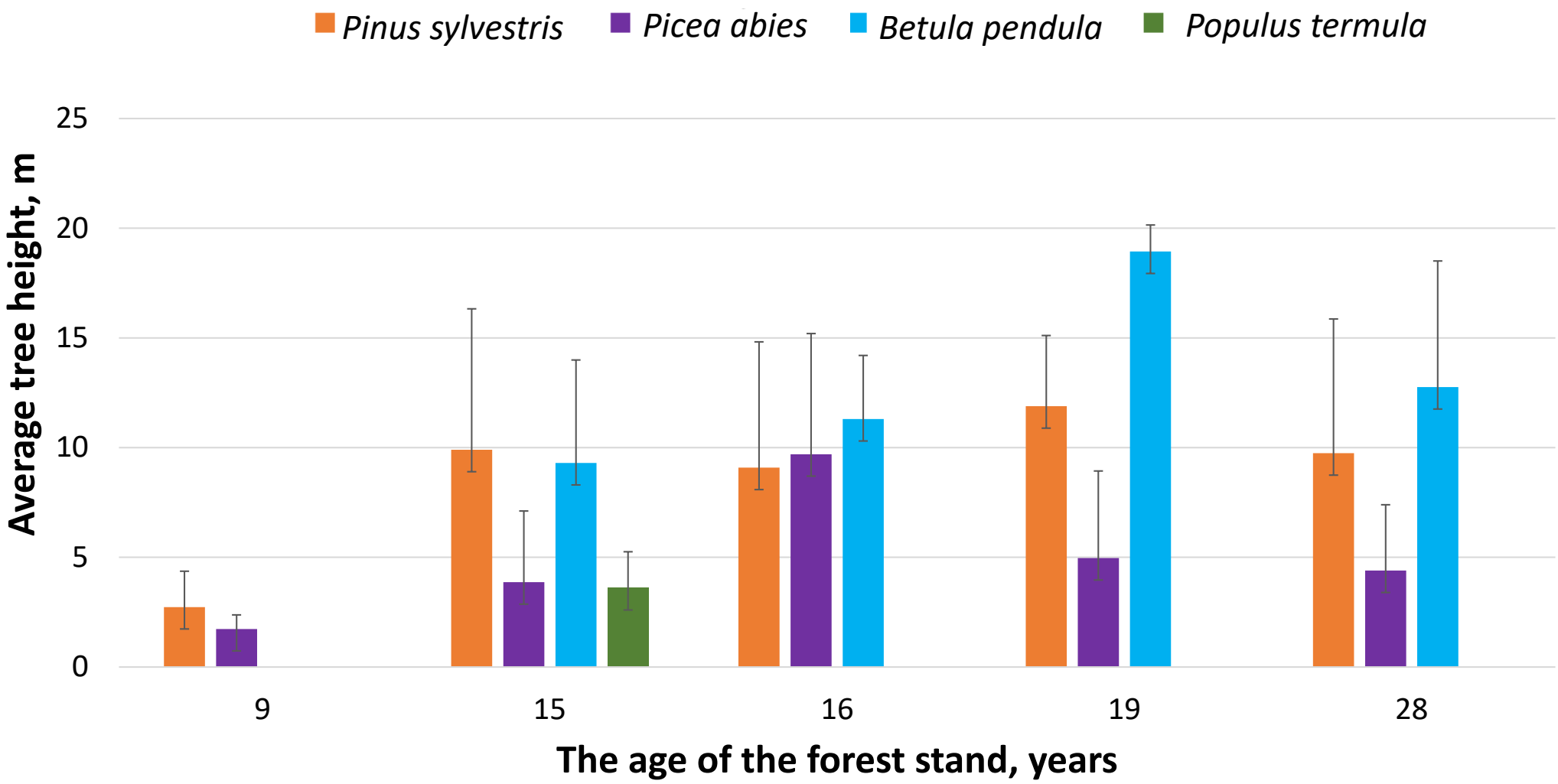
- In each plot, the species are listed and the percentage of lichen cover on the trunk is determined.



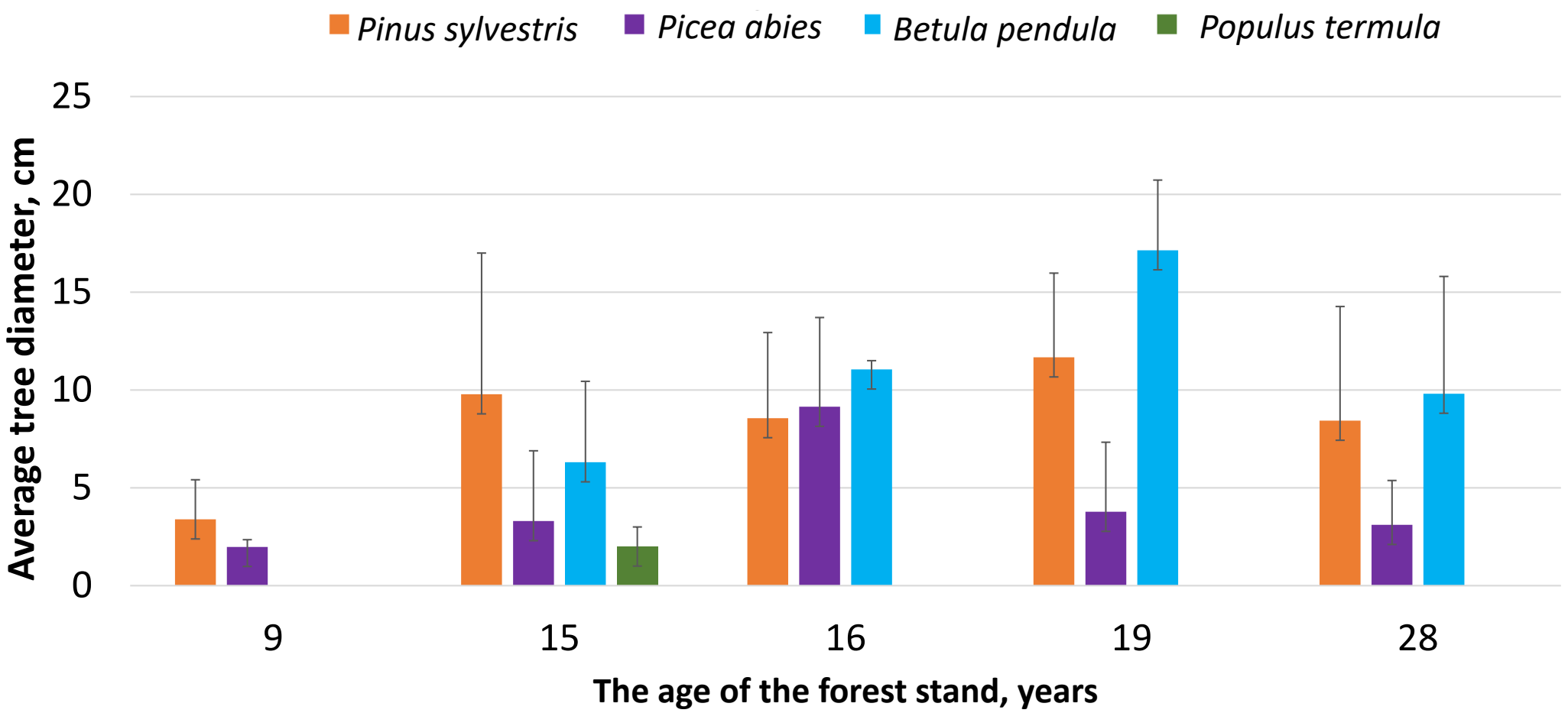
The average number of trees per hectare and the diversity of tree species in stands of different ages.



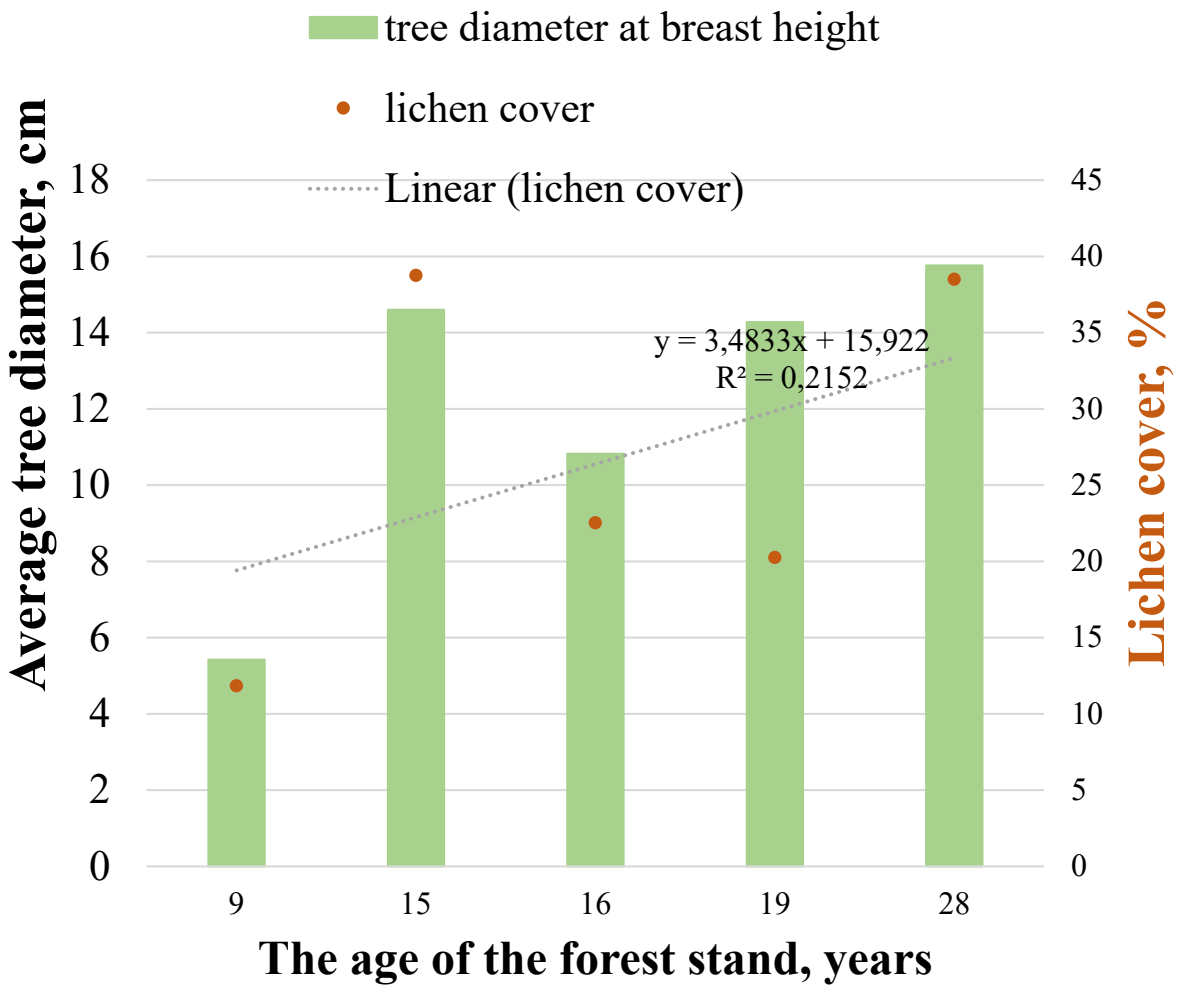
The average height of trees in stands of different ages.

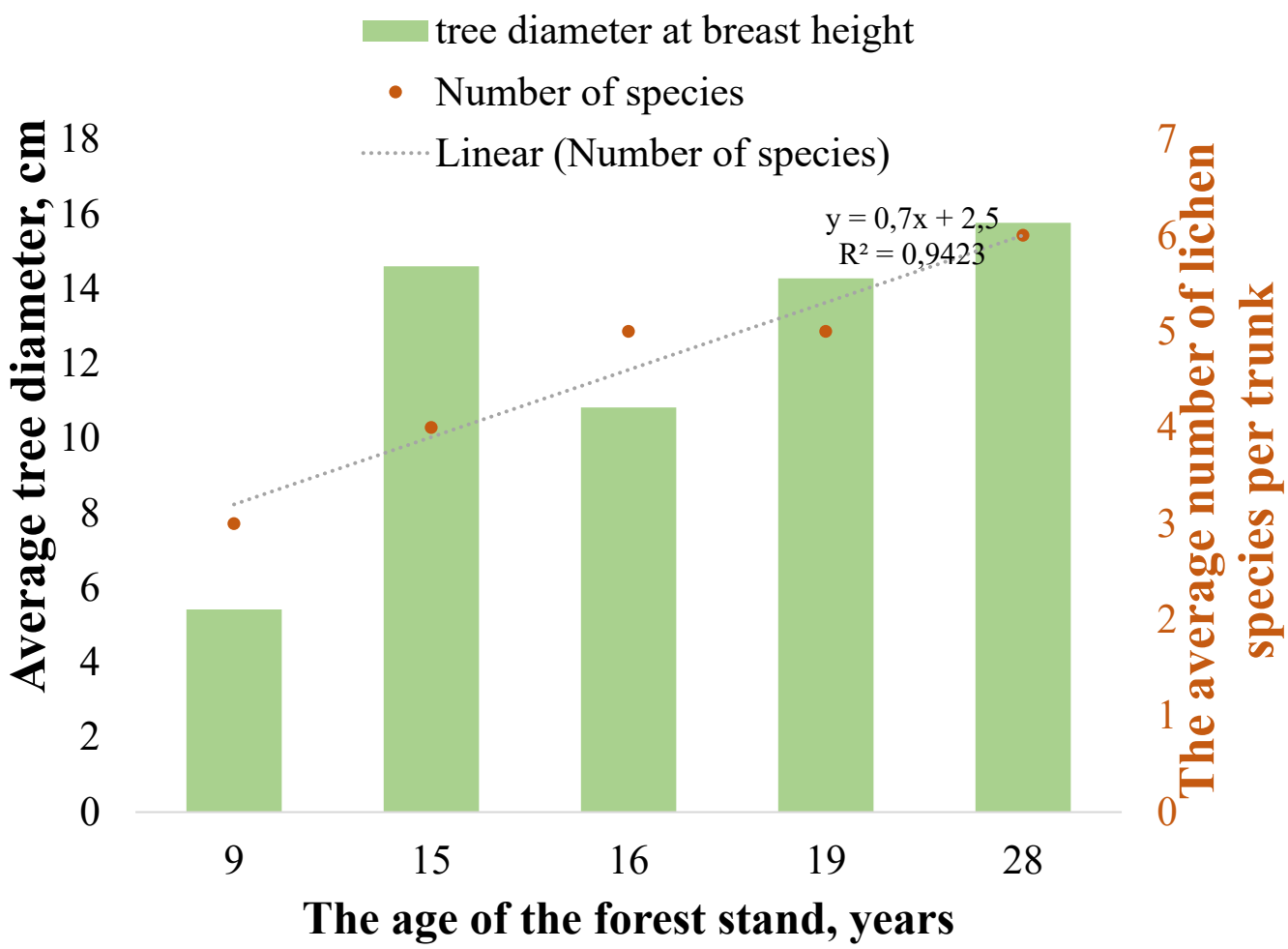


The average tree diameter of the species found in the forest stands in stands of different ages.

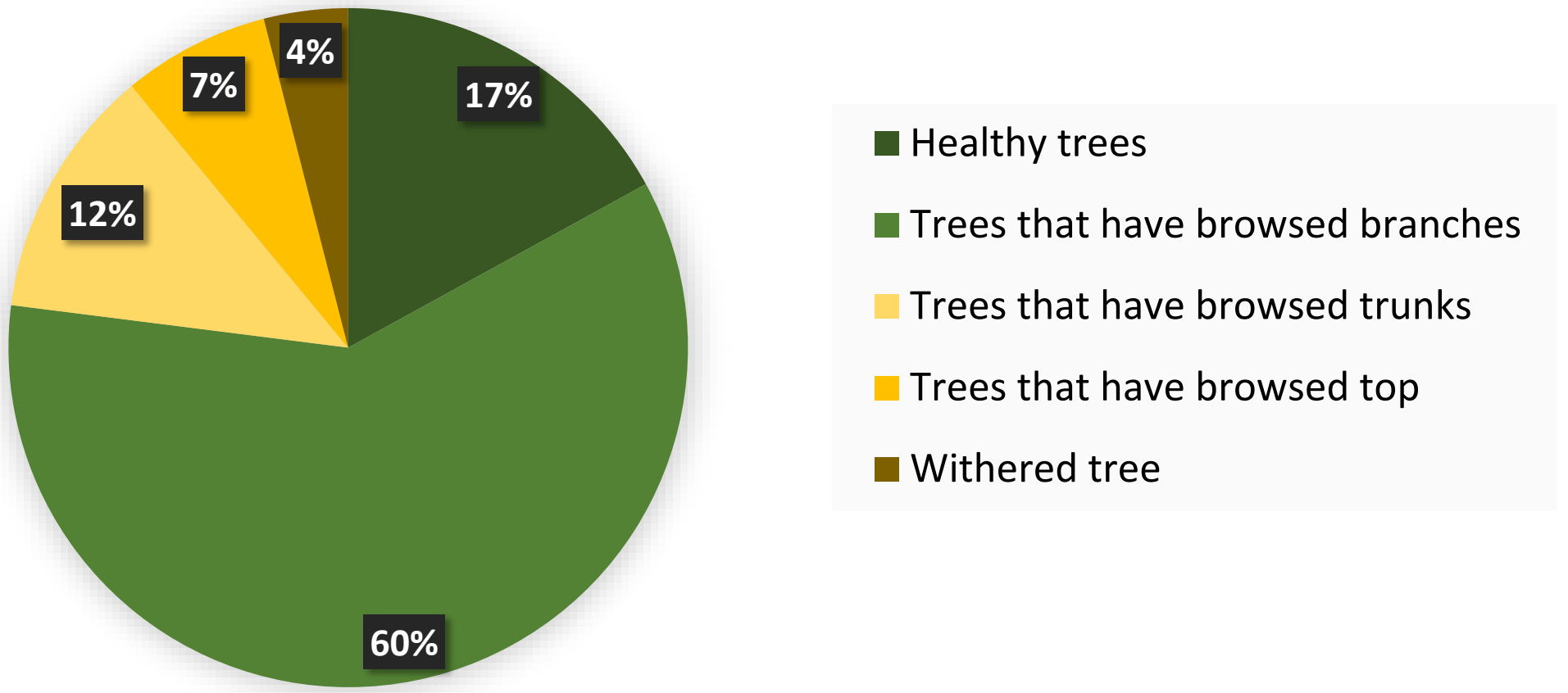


Lichen cover on the trunk and average number of species in stands of different ages.





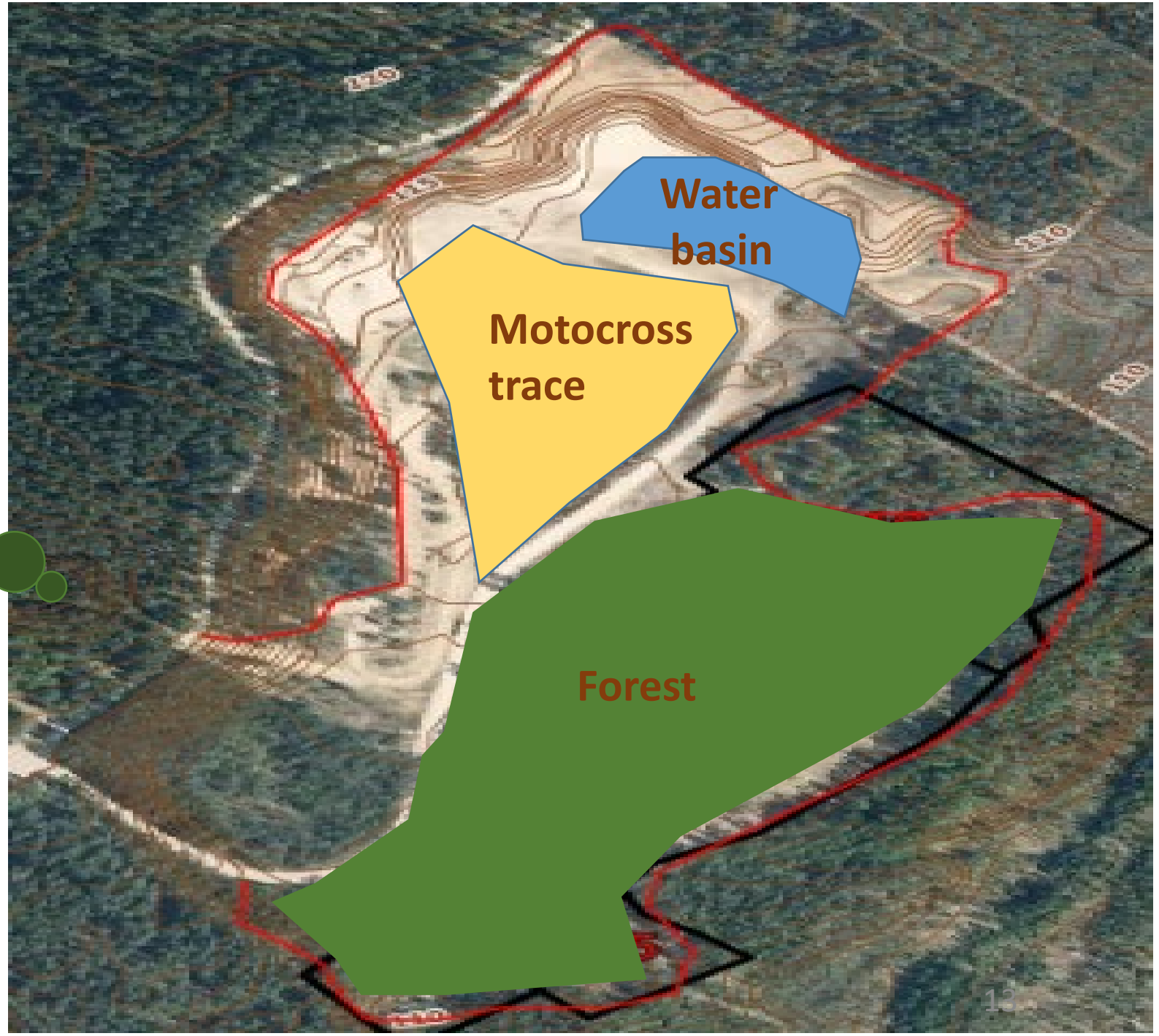
Tree browsing in 9 year old forest stand



Conclusions

1. In the sand post-mining site, Scot pine is found in forest stands of different ages, starting with 16-year-old stands, the proportion of birch in the stands increases and in 28 year old stands proportion of spruce in the amount of 63%.
2. Natural restoration has been successful- there is a sufficient number of trees per hectare.
3. Scots pine is the most suitable species for successful sand post-mining site restoration, as it shows the best dendrometric parameters in stands of different ages.
4. The lichen cover on trees does not depend on the age of the forest stand, but the diversity of lichen species increases with the age of the stand.

A future vision for the reclamation of the entire sand post-mining site



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Thank You for Your attention!