



# Effects of thinning on floristic diversity

## Effetti dei diradamenti sulla biodiversità vegetale

Elisa Bianchetto

**NUOVI APPROCCI PER LA GESTIONE  
SOSTENIBILE DEL PINO NERO:**  
*biodiversità e mitigazione*

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# Which variations in ecological conditions?

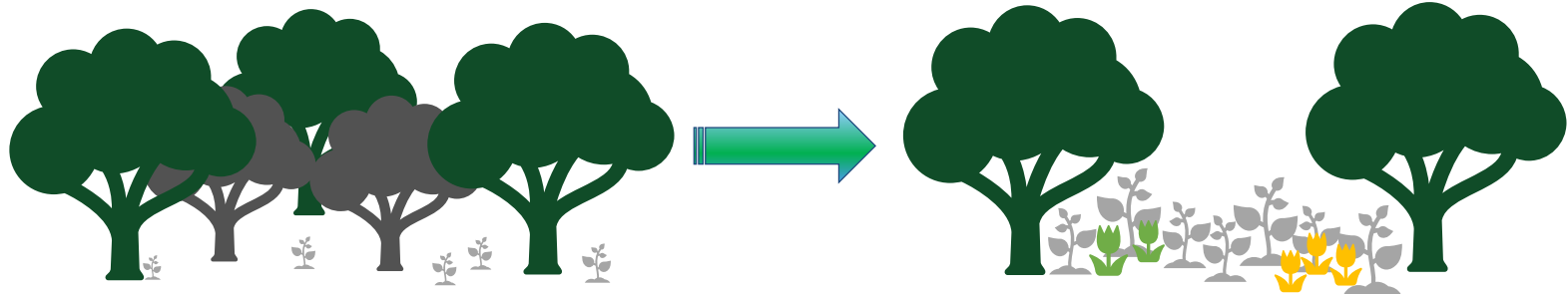
**Firstly** there are variations in:

- ✓ Solar radiation ☀️
- ✓ Moisture ☁️
- ✓ Temperature 🌡️



**Later** there are variations in:

- ✓ Specific composition of the vegetation in the herbaceous layer



# Monitoring calendar

- ✓ A3: Biodiversity monitoring before treatment



May – June 2015

- ✓ D2: Biodiversity monitoring after treatment



May – July 2016



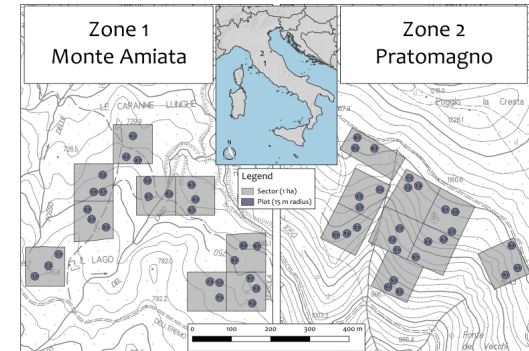
May – July 2017



May – July 2018

# Monitoring

- ✓ Two areas: Amiata Val d'Orcia and Pratomagno
- ✓ 27 circular fixed area sampling plots (10 m radius)
- ✓ 9 sampling plots each forest treatment
- ✓ Visual estimation of the total canopy
- ✓ Visual estimation of the herbaceous, shrubs and trees layers
- ✓ Identification of all the species in the plots
- ✓ Visual estimation of abundance and dominance of each species



Phytosociological  
method

Range scale:

1: 1-5  
2: 6-25     +: <1  
3: 26-50    r: rare  
4: 51-75  
5: 76-100

# Vegetation

The vegetation of the two pine forests is not comparable for two reasons:

- ✓ Different ecological and physical site conditions
- ✓ Different use of soil at the moment of reforestation (wooded pastures and arable lands in Amiata and natural ridge environment in Pratomagno)



Amiata



Pratomagno



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# Trees and Shrubs

## Amiata

*Abies alba*  
*Acer campestre*  
*Acer opalus*  
*Acer pseudoplatanus*  
*Alnus cordata*  
*Alnus glutinosa*  
*Crataegus monogyna*  
*Fraxinus ornus*  
*Juniperus communis*  
*Malus communis*  
*Ostrya carpinifolia*  
*Pinus nigra*  
*Pinus sylvestris*  
*Prunus avium*  
*Pseudosuga menziesii*  
*Pyrus piraster*  
*Quercus cerris*  
*Quercus pubescens*  
*Rosa sp.*  
*Salix caprea*  
*Sorbus torminalis*  
*Ulmus campestre*

## Pratomagno

*Abies alba*  
*Acer opalus*  
*Acer pseudoplatanus*  
*Cedrus deodara*  
*Crataegus monogyna*  
*Fagus sylvatica*  
*Fraxinus ornus*  
*Juniperus communis*  
*Ostrya carpinifolia*  
*Pinus nigra*  
*Pseudosuga menziesii*  
*Pyrus piraster*  
*Quercus cerris*  
*Rosa sp.*  
*Sorbus torminalis*  
*Ulmus campestre*



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# Amiata – Herbaceous vegetation

*Brachypodium rupestre* (Host) R. et S.  
*Carex flacca* Schereber  
*Dactylis glomerata* L.  
*Buglossoides purpureocaerulea* (L.) Johnston  
*Equisetum* sp.  
*Bromus erectus* Huds.  
*Clematis vitalba* L.  
*Briza media* L.  
*Vicia sparsiflora* Ten. *Ochroleuca* Ten.  
*Lonicera* sp.  
*Daucus carota* L.  
*Potentilla recta* L.  
*Trifolium pratense* L.  
*Clinopodium vulgare* L.  
*Tussilago farfara* L.



# Pratomagno – Herbaceous vegetation

*Brachypodium rupestre* (Host) R. et S.  
*Viola reichenbachiana* Jordan ex Boreau  
*Rubus canescens* D.C.  
*Poa nemoralis* L.  
*Murbekiella zanonii* (Ball) Rothm.  
*Digitalis micrantha* Roth  
*Crepis leontodontoides* All.  
*Veronica officinalis* L.  
*Dactylis glomerata* L.  
*Clinopodium* sp.  
*Bromus erectus* Huds.  
*Cruciata glabra* (L.) Ehrend.  
*Galium mollugo* (L.)  
*Galium lucidum* All.  
*Silene* sp.



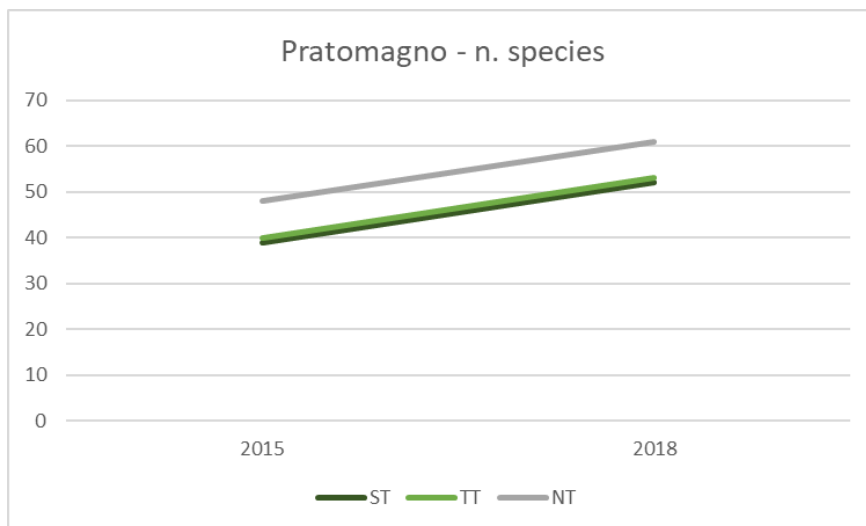
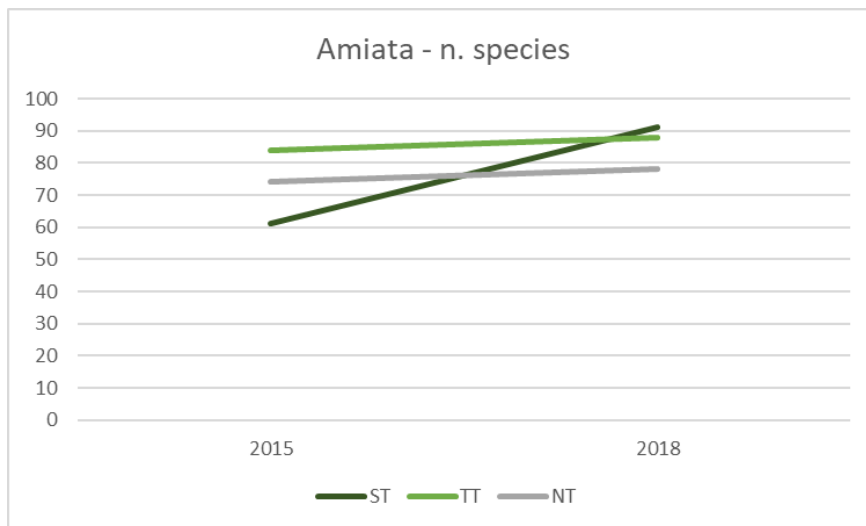
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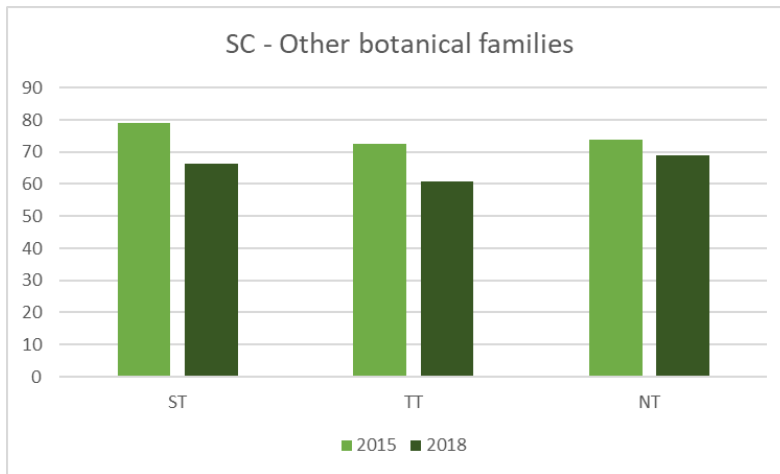
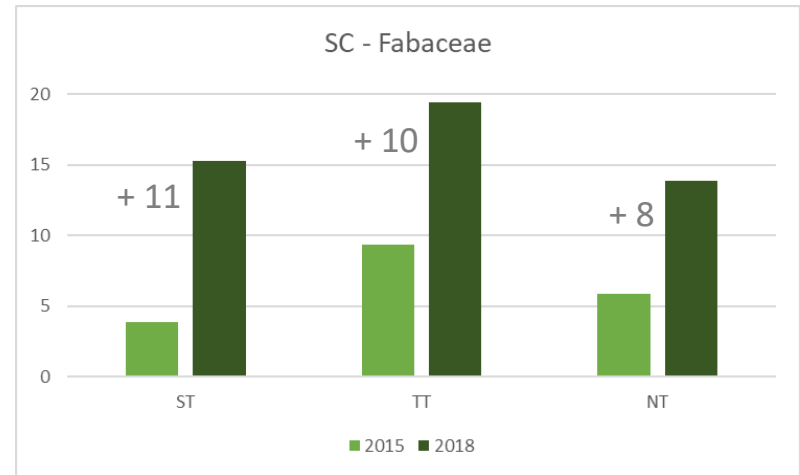
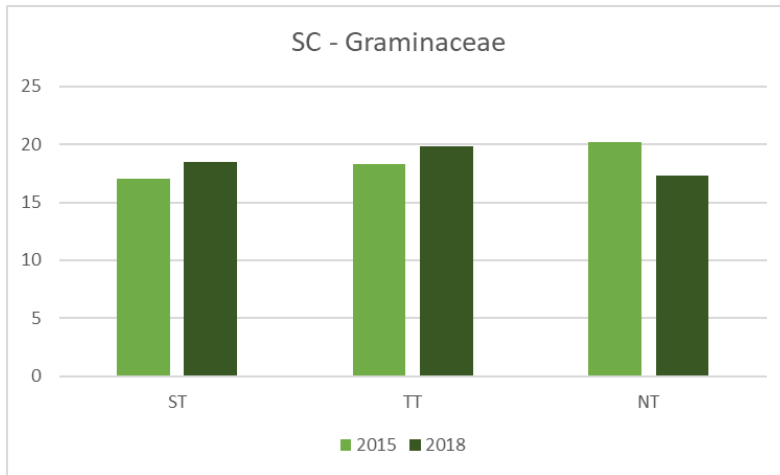


# Results: number of species

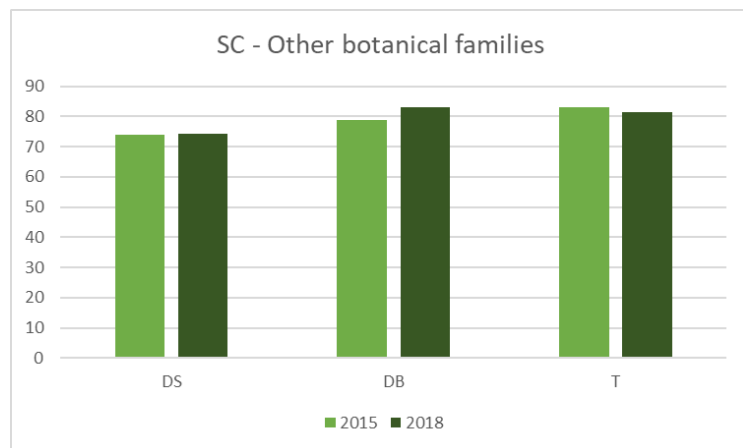
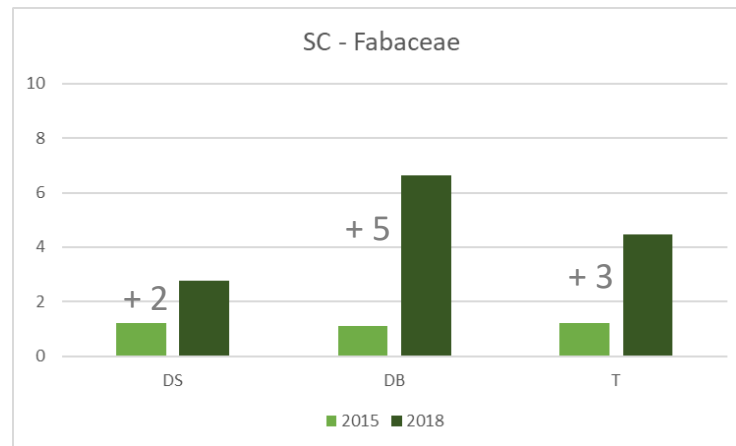
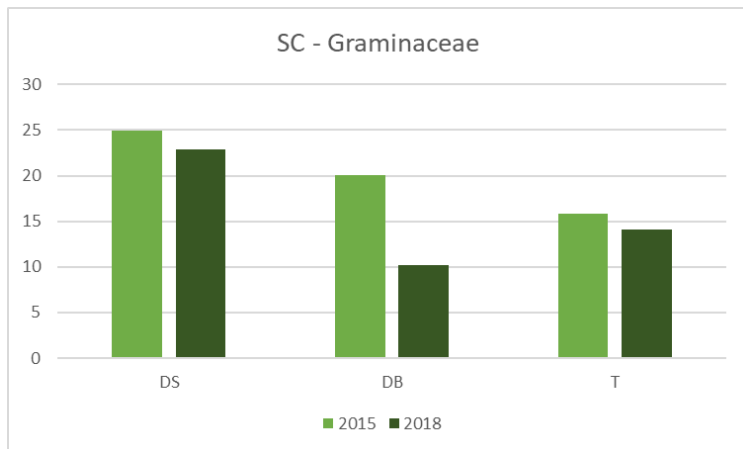
During the 4 years of the project 224 species have been detected



# Amiata - SC botanical families



# Pratomagno - SC botanical families



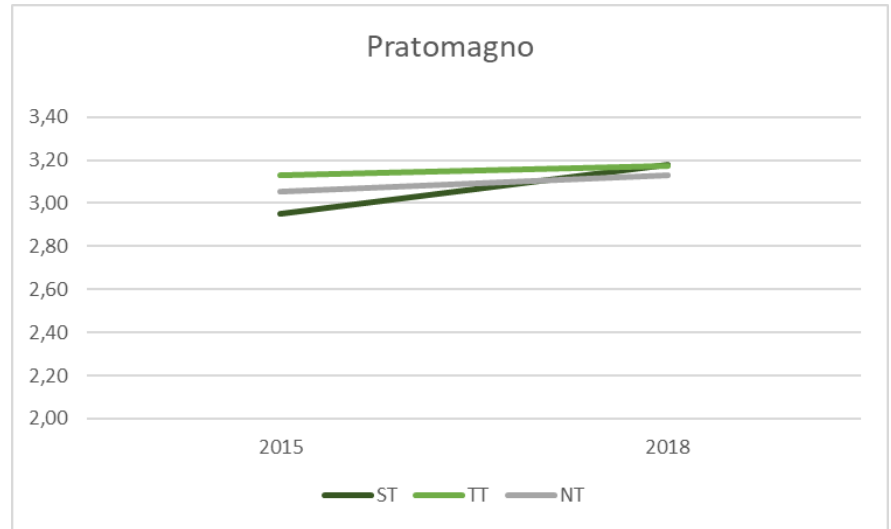
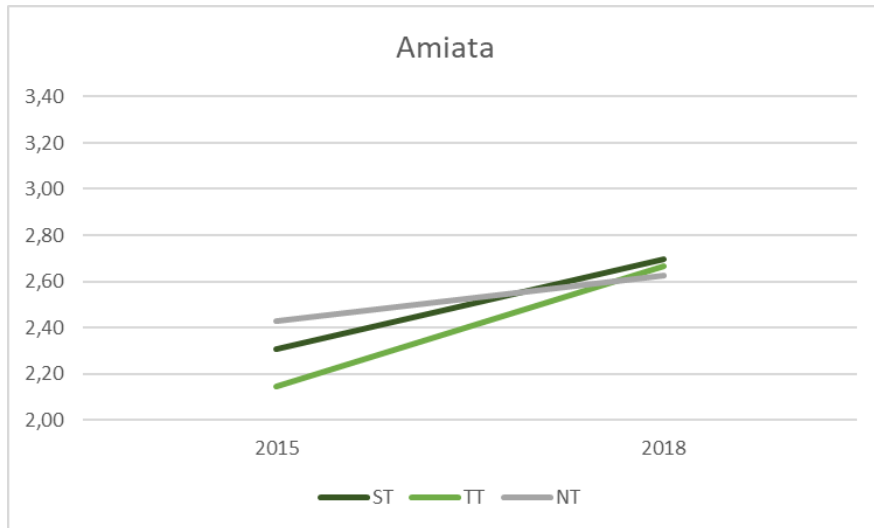
# Annual species



No significant variations in the number of annual species

Variation in then number of annual species 2015 vs 2018		
Treatment	Amiata	Pratomagno
ST	+8	+1
TT	-1	+2
NT	+3	+3

# Shannon Index (H')



Shannon Index (H') increase 2015 vs 2018		
Treatment	Amiata	Pratomagno
ST	<b>+0,39</b>	<b>+0,23</b>
TT	<b>+0,52</b>	<b>+0,04</b>
NT	<b>+0,20</b>	<b>+0,07</b>

Shannon Index increases more in the thinned plots than in the non thinned



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# A new species in Pratomagno

Atti Società Toscana di Scienze Naturali

Angiolini C., Cannucci S., Bianchetto E.

*Aphanes microcarpa* (Boiss. & Reut.) Rothm. (Rosaceae)



Plot 2.2 Selective thinning  
Giugno 2017, Monte Lori, Pratomagno  
(Arezzo), 1144 m s.l.m.  
Comunità annuali xeriche.  
Specie di nuova segnalazione per la  
provincia di Arezzo.

# Final considerations

- ✓ Data analysis for the first 3 years of survey shows no significant differences between silvicultural treatments
- ✓ In Amiata there were variations in the floristic composition with a higher increase in the number of species in the thinned plots than in the non thinned; in Pratomagno variations are the same in all the treatments
- ✓ The legumes have increased in number and CS in the years after thinning
- ✓ The dry climate trend seems to have negatively affected the presence of herbaceous vegetation
- ✓ An observation period of only 3 years seems not to be sufficient



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Thank you for your attention



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