

**Supplementary Material**

**Tab. S1** - *Pinus nigra* forestation data. For all forestation sites, the previous land cover was non-forest, with no management system followed. *Pinus nigra* mean coverage was as determined from the Braun-Blanquet scale.

Rel.	Long. E	Lat. N	Location	Park	Altitude (m a.s.l.)	Year of forestation	<i>Pinus nigra</i> coverage (%)	Natural type	Distance between survey plots (m)
11	351158	4752467	Bove	Sibillini National Park	1675	1930	50	<i>Fagus sylvatica</i> forest	232, 139
12	351231	4752040	Bove	Sibillini National Park	1590	1930	80	<i>Fagus sylvatica</i> forest	745, 749
13	360546	4741764	Vettore	Sibillini National Park	1300	1950	70	<i>Fagus sylvatica</i> forest	2569, 809
14	360468	4741726	Vettore	Sibillini National Park	1295	1950	50	<i>Fagus sylvatica</i> forest	2349, 241
15	377243	4665104	Ovindoli	Sirente-Velino Natural Regional Park	1270	1950	50	<i>Fagus sylvatica</i> forest	4632, 639
16	363668	4699927	Arischia	Gran Sasso e Monti della Laga National Park	1210	1930	60	<i>Fagus sylvatica</i> forest	1106, 758
17	364148	4699620	Arischia	Gran Sasso e Monti della Laga National Park	1205	1930	50	<i>Fagus sylvatica</i> forest	1609, 994
18	363602	4699917	Arischia	Gran Sasso e Monti della Laga National Park	1190	1930	80	<i>Fagus sylvatica</i> forest	1136, 958
19	411342	4625876	Villetta Barrea	Abruzzo, Lazio and Molise National Park	1182	1930	50	<i>Fagus sylvatica</i> forest	1495, 161
20	285336	4852663	Carpegna	Sasso Simone e Simoncello Natural regional Park	1153	1932/40	50	<i>Fagus sylvatica</i> forest	170, 775
21	346034	4742469	Pettenaio	Sibillini National Park	950	1950	50	<i>Ostrya carpinifolia</i> and <i>Q. pubescens</i> forest	607, 926
22	366518	4688407	Roio	Gran Sasso e Monti della Laga National Park	935	1900	70	<i>Quercus pubescens</i> forest	2312, 334
23	366523	4688607	Roio	Gran Sasso e Monti della Laga National Park	905	1900	70	<i>Quercus pubescens</i> forest	2618, 399
24	311405	4814802	Acuto	Monte Catria Group	900	1952/56	50	<i>Ostrya carpinifolia</i> and <i>Q. cerris</i> forest	2480.0 20
25	313272	4812637	Catria	Monte Catria Group	770	1952/56	50	<i>Quercus pubescens</i> forest	1014, 832
26	327334	4788505	Tegolaro	Gola della Rossa e di Frasassi Natural Regional Park	745	1914/16	60	<i>Ostrya carpinifolia</i> forest	8802, 067
27	432997	4656548	Lama dei Peligni	Majella National Park	731	1920	70	<i>Ostrya carpinifolia</i> forest	649, 561
28	335398	4811897	Predicatore	Gola della Rossa e di Frasassi Natural Regional Park	700	1914/16	50	<i>Ostrya carpinifolia</i> forest	620, 735
29	327079	4788612	Tegolaro	Gola della Rossa e di Frasassi Natural Regional Park	700	1914/16	50	<i>Ostrya carpinifolia</i> forest	8828, 867
30	335316	4811778	Predicatore	Gola della Rossa e di Frasassi Natural Regional Park	655	1914/16	80	<i>Ostrya carpinifolia</i> forest	3076, 977

**Effects of old *Pinus nigra* reforest plantation on the floristic-vegetational composition along an elevation gradient (central Apennines, Italy)**

iForest – Biogeosciences and Forestry – doi: [10.3832/ifor3215-013](https://doi.org/10.3832/ifor3215-013)

**Tab. S2** - List of the species and their biological forms (Pignatti 1982). (SBT): social behaviour type (Bartha et al. 2008); (EIV): ecological indicator value (L, Light; T, Temperature; C, Continentality; U, Moisture; R, Reaction of soil; N, Nitrogen - Ellenberg et al. 1992, Pignatti 2005); (UN): high altitude natural forest; (UR): high altitude pine plantation; (LR): low altitude pine plantation; (LN): low altitude natural forest.

Biological form	SBT	EIV						Species	Frequency (%)			
		L	T	C	U	R	N		UN	UR	LR	LN
Phanerophytes	1	3	5	5	0	0	0	<i>Abies alba</i> Mill.	0	0	0	10
Phanerophytes	4							<i>Abies cephalonica</i> Loudon	0	0	30	0
Phanerophytes	1	5	7	4	5	7	6	<i>Acer campestre</i> L.	0	20	90	50
Phanerophytes	1	6	8	5	3	8	4	<i>Acer monspessulanum</i> L. subsp. <i>monspessulanum</i>	10	10	30	10
Phanerophytes	1	5	5	6	6	7	7	<i>Acer opalus</i> Mill. subsp. <i>obtusatum</i> (Waldst. & Kit. ex Willd.) Gams	30	60	90	80
Phanerophytes	1	4	X	4	6	X	7	<i>Acer pseudoplatanus</i> L.	20	50	30	10
Geophytes	1	5	4	5	6	7	8	<i>Adoxa moschatellina</i> L. subsp. <i>moschatellina</i>	10	0	0	0
Hemicryptophytes	2	5	7	6	4	8	4	<i>Aegonychon purpureocaeruleum</i> (L.) Holub	0	0	10	30
Hemicryptophytes	3	7	6	5	4	8	4	<i>Agrimonia eupatoria</i> L. subsp. <i>eupatoria</i>	0	0	0	10
Hemicryptophytes	3	6	X	4	6	X	6	<i>Ajuga reptans</i> L.	20	0	0	0
Hemicryptophytes	5	5	6	5	5	7	9	<i>Alliaria petiolata</i> (M.Bieb.) Cavara & Grande	10	0	0	0
Phanerophytes	3	7	7	4	3	X	3	<i>Amelanchier ovalis</i> Medik. subsp. <i>ovalis</i>	20	50	0	0
Hemicryptophytes	4	7	5	5	4	8	X	<i>Arabis hirsuta</i> (L.) Scop.	0	20	0	10
Hemicryptophytes	3	7	6	6	4	8	3	<i>Arabis sagittata</i> (Bertol.) DC.	0	0	0	10
Chamaephytes	3	6	3	5	3	X	2	<i>Arctostaphylos uva-ursi</i> (L.) Spreng.	0	10	0	0
Hemicryptophytes	1	4	7	6	5	9	5	<i>Aremonia agrimonoides</i> (L.) DC. subsp. <i>agrimonoides</i>	20	0	0	20
Geophytes	5	8	8	5	3	6	3	<i>Aristolochia lutea</i> Desf.	10	0	0	0
Geophytes	4	6	8	4	4	5	5	<i>Arum italicum</i> Mill. subsp. <i>italicum</i>	0	0	0	10
Geophytes	5	3	6	5	7	7	8	<i>Arum maculatum</i> L.	20	0	0	10
Geophytes	2	6	9	4	2	5	5	<i>Asparagus acutifolius</i> L.	0	0	30	30
Chamaephytes	3	11	6	7	2	7	2	<i>Asperula purpurea</i> (L.) Ehrend.	0	20	40	20
Hemicryptophytes	2	6	7	2	4	2	3	<i>Asplenium adiantum-nigrum</i> L. subsp. <i>adiantum-nigrum</i>	0	0	0	10
Hemicryptophytes	3	9	7	5	2	7	3	<i>Asplenium ceterach</i> L. (s.l.)	10	0	0	10
Hemicryptophytes	3	9	5	4	X	X	5	<i>Bellis perennis</i> L.	0	0	10	0
Hemicryptophytes	3	6	5	4	6	4	3	<i>Betonica officinalis</i> L.	0	0	0	20
Hemicryptophytes	3	8	6	4	5	8	4	<i>Brachypodium rupestre</i> (Host) Roem. & Schult.	10	60	80	50
Hemicryptophytes	2	4	5	5	5	6	6	<i>Brachypodium sylvaticum</i> (Huds.) P.Beauv.	0	0	10	30
Hemicryptophytes	3	8	5	7	3	8	3	<i>Bromopsis erecta</i> (Huds.) Fourr. (s.l.)	10	40	60	40
Hemicryptophytes	5	6	5	5	6	8	6	<i>Bromopsis ramosa</i> (Huds.) Holub subsp. <i>ramosa</i>	0	0	0	10
Geophytes	3	8	6	5	5	X	4	<i>Bunium bulbocastanum</i> L.	10	0	0	0
Hemicryptophytes	3	6	6	6	3	9	3	<i>Bupleurum falcatum</i> L. subsp. <i>cernuum</i> (Ten.) Arcang.	0	10	0	10
Hemicryptophytes	3	7	6	6	3	8	2	<i>Campanula bononiensis</i> L.	0	0	0	10
Hemicryptophytes	3	7	X	7	4	7	X	<i>Campanula glomerata</i> L.	20	0	20	0
Hemicryptophytes	3	7	5	5	5	X	2	<i>Campanula micrantha</i> Bertol.	20	0	0	0

**Effects of old *Pinus nigra* reforest plantation on the floristic-vegetational composition along an elevation gradient (central Apennines, Italy)**iForest – Biogeosciences and Forestry – doi: [10.3832/ifor3215-013](https://doi.org/10.3832/ifor3215-013)

Biological form	SBT	EIV						Species	Frequency (%)			
		L	T	C	U	R	N		UN	UR	LR	LN
Hemicryptophytes	2	5	5	5	4	8	3	<i>Campanula persicifolia</i>	10	0	0	10
Hemicryptophytes	3	7	7	5	4	6	4	<i>Campanula rapunculus</i> L.	10	0	0	20
Hemicryptophytes	3	8	2	5	5	5	0	<i>Campanula scheuchzeri</i> Vill. (s.l.)	0	10	0	0
Hemicryptophytes	2	4	5	5	5	8	8	<i>Campanula trachelium</i> L. subsp. <i>trachelium</i>	10	0	0	10
Geophytes	1	3	5	4	5	7	6	<i>Cardamine bulbifera</i> (L.) Crantz	0	0	0	10
Hemicryptophytes	4	7	8	4	3	X	3	<i>Carduus pycnocephalus</i> L. subsp. <i>pycnocephalus</i>	0	0	0	10
Hemicryptophytes	2	3	5	5	4	X	3	<i>Carex digitata</i> L.	0	0	10	20
Geophytes	2	7	5	5	6	8	X	<i>Carex flacca</i> Schreb. subsp. <i>erythrostachys</i> (Hoppe) Holub	0	0	10	0
Geophytes	2	7	5	5	6	8	X	<i>Carex flacca</i> Schreb. subsp. <i>flacca</i>	10	0	20	20
Hemicryptophytes	3	7	5	5	3	8	3	<i>Carex humilis</i> Leyss.	10	30	0	0
Hemicryptophytes	3	6	5	5	3	6	2	<i>Carex macrolepis</i> DC.	10	40	0	10
Phanerophytes	1	4	6	4	X	X	X	<i>Carpinus betulus</i> L.	0	0	0	10
Phanerophytes	2	4	7	6	3	4	5	<i>Carpinus orientalis</i> Mill. subsp. <i>orientalis</i>	0	0	0	30
Phanerophytes	4							<i>Cedrus deodara</i> (Roxb.) G.Don	0	0	10	0
Hemicryptophytes	3	8	4	4	4	5	4	<i>Centaurea triumfettii</i> All.	0	10	10	0
Geophytes	1	2	5	4	4	7	4	<i>Cephalanthera damasonium</i> (Mill.) Druce	40	10	40	20
Geophytes	2	4	5	5	3	8	3	<i>Cephalanthera longifolia</i> (L.) Fritsch	40	40	40	20
Geophytes	2	3	5	5	4	8	3	<i>Cephalanthera rubra</i> (L.) Rich.	20	0	0	0
Hemicryptophytes	3	7	4	4	4	7	7	<i>Cirsium morisianum</i> Rchb.f.	10	10	0	0
Hemicryptophytes	3	6	7	5	3	8	3	<i>Clematis recta</i> L.	0	0	10	10
Phanerophytes	5	7	7	4	5	7	7	<i>Clematis vitalba</i> L.	20	30	70	40
Chamaephytes	3	9	X	5	5	9	2	<i>Clinopodium alpinum</i> (L.) Merino subsp. <i>alpinum</i>	0	0	10	0
Hemicryptophytes	3	4	6	4	5	5	4	<i>Clinopodium nepeta</i> (L.) Kuntze	0	0	0	20
Hemicryptophytes	2	7	5	4	4	7	3	<i>Clinopodium vulgare</i> L. subsp. <i>vulgare</i>	10	0	10	0
Phanerophytes	2	6	7	6	5	8	4	<i>Cornus mas</i> L.	0	0	30	70
Phanerophytes	3	7	5	5	7	8	X	<i>Cornus sanguinea</i> L. (s.l.)	0	0	0	30
Chamaephytes	3	11	6	4	3	7	2	<i>Coronilla minima</i> L. subsp. <i>minima</i>	0	0	10	0
Phanerophytes	2	6	5	4	5	5	8	<i>Corylus avellana</i> L.	0	10	0	50
Nanophanerophytes	3	7	6	7	3	7	2	<i>Cotinus coggygria</i> Scop.	0	0	20	20
Nanophanerophytes	3	7	5	6	3	9	2	<i>Cotoneaster pyrenaicus</i> Gand.	0	10	0	0
Nanophanerophytes	3							<i>Cotoneaster tomentosus</i> (Aiton) Lindl.	10	20	0	0
Phanerophytes	2	6	6	5	5	5	4	<i>Crataegus laevigata</i> (Poir.) DC.	0	0	0	20
Phanerophytes	5	6	7	5	4	6	3	<i>Crataegus monogyna</i> Jacq.	10	0	0	50
Hemicryptophytes	3	9	2	5	5	7	7	<i>Crepis aurea</i> (L.) Cass. subsp. <i>glabrescens</i> (Caruel) Arcang.	0	10	0	0
Hemicryptophytes	3	5	8	4	4	3	7	<i>Crepis leontodontoides</i> All.	0	0	10	0
Hemicryptophytes	2	5	6	5	5	6	6	<i>Cruciata glabra</i> (L.) C.Bauhin ex Opiz	0	0	10	40
Hemicryptophytes	4	7	6	5	5	5	5	<i>Cruciata laevipes</i> Opiz	0	0	10	0
Geophytes	2	4	8	5	5	5	5	<i>Cyclamen hederifolium</i> Aiton subsp. <i>hederifolium</i>	20	0	0	20
Geophytes	2	4	9	5	3	X	5	<i>Cyclamen repandum</i> Sm. subsp. <i>repandum</i>	0	0	10	30
Phanerophytes	3	6	5	3	6	4	5	<i>Cytisophyllum sessilifolium</i> (L.) O.Lang	0	60	20	50
Chamaephytes	3	7	7	7	5	7	3	<i>Cytisus spinescens</i> C.Presl	10	50	10	10

Allegrezza M, Pesaresi S, Ballelli S, Tesei G, Ottaviani C (2020).

**Effects of old *Pinus nigra* reforest plantation on the floristic-vegetational composition along an elevation gradient (central Apennines, Italy)**

iForest – Biogeosciences and Forestry – doi: [10.3832/ifor3215-013](https://doi.org/10.3832/ifor3215-013)

Biological form	SBT	EIV						Species	Frequency (%)			
		L	T	C	U	R	N		UN	UR	LR	LN
Hemicryptophytes	3	7	6	5	4	5	6	<i>Dactylis glomerata</i> L. subsp. <i>glomerata</i>	0	10	50	60
Geophytes	2	7	5	5	5	X	4	<i>Dactylorhiza maculata</i> (L.) Soó (s.l.)	0	10	0	0
Nanophanerophytes	2	6	6	4	4	8	3	<i>Daphne laureola</i> L.	10	10	40	40
Nanophanerophytes	3	11	5	4	2	7	1	<i>Daphne oleoides</i> Schreb. subsp. <i>oleoides</i>	10	10	0	0
Hemicryptophytes	2	8	6	5	5	8	5	<i>Digitalis micrantha</i> Roth ex Schweigg.	70	20	40	10
Geophytes	2	7	6	5	3	8	4	<i>Dioscorea communis</i> (L.) Caddick & Wilkin	10	0	10	20
Geophytes	2	6	4	5	6	6	6	<i>Doronicum columnae</i> Ten.	10	0	0	0
Nanophanerophytes	5							<i>Emerus major</i> Mill. subsp. <i>emeroides</i> (Boiss. & Spruner) Soldano & F.Conti	0	0	30	50
Nanophanerophytes	5	7	6	4	3	9	2	<i>Emerus major</i> Mill. subsp. <i>major</i>	0	10	0	0
Hemicryptophytes	1	6	4	5	5	4	4	<i>Epilobium montanum</i> L.	20	0	0	0
Geophytes	2	8	6	5	4	8	4	<i>Epipactis atrorubens</i> (Hoffm.) Besser	0	10	0	0
Geophytes	2	3	5	5	5	7	5	<i>Epipactis helleborine</i> (L.) Crantz	50	60	30	10
Geophytes	3	7	7	4	3	6	2	<i>Epipactis microphylla</i> (Ehrh.) Sw.	10	0	0	0
Geophytes	2							<i>Epipactis muelleri</i> Godfery	20	10	0	0
Geophytes	4	6	X	X	6	X	3	<i>Equisetum arvense</i> L.	0	10	0	0
Hemicryptophytes	3	9	7	7	3	8	3	<i>Eryngium amethystinum</i> L.	0	10	20	0
Phanerophytes	2	6	5	5	5	8	5	<i>Euonymus europaeus</i> L.	0	0	0	20
Phanerophytes	2	4	5	4	5	8	4	<i>Euonymus latifolius</i> (L.) Mill.	0	0	10	30
Phanerophytes	2	4	5	6	5	8	4	<i>Euonymus verrucosus</i> Scop.	10	0	0	0
Chamaephytes	2	4	5	4	5	7	6	<i>Euphorbia amygdaloides</i> L.	10	0	0	40
Hemicryptophytes	3	7	7	5	3	5	5	<i>Euphorbia cyparissias</i> L.	10	20	0	0
Chamaephytes	2	4	5	5	5	8	5	<i>Euphorbia dulcis</i> L.	0	0	0	20
Phanerophytes	1	3	5	4	5	X	7	<i>Fagus sylvatica</i> L. subsp. <i>sylvatica</i>	100	70	20	10
Hemicryptophytes	3	9	8	5	3	5	2	<i>Ferula communis</i> L. subsp. <i>communis</i>	0	0	10	0
Hemicryptophytes	3	11	6	5	1	6	2	<i>Festuca circummediterranea</i> Patzke	10	10	0	0
Hemicryptophytes	2	5	5	4	4	5	4	<i>Festuca heterophylla</i> Lam.	30	10	30	60
Hemicryptophytes	3	8	4	4	3	4	2	<i>Festuca inops</i> De Not.	0	0	0	10
Hemicryptophytes	3	8	4	4	3	6	2	<i>Festuca laevigata</i> Gaudin	0	0	0	10
Hemicryptophytes	3	8	4	5	3	6	2	<i>Festuca stricta</i> Host subsp. <i>trachyphylla</i> (Hack.) Patzke ex Pils	0	30	0	0
Hemicryptophytes	2	6	X	4	4	X	5	<i>Fragaria vesca</i> L. subsp. <i>vesca</i>	20	0	20	40
Phanerophytes	2	4	8	6	7	7	8	<i>Fraxinus angustifolia</i> Vahl subsp. <i>oxycarpa</i> (M.Bieb. ex Willd.) Franco & Rocha Afonso	0	10	0	0
Phanerophytes	1	4	5	4	7	7	7	<i>Fraxinus excelsior</i> L. subsp. <i>excelsior</i>	10	10	10	0
Phanerophytes	2	5	8	6	3	8	3	<i>Fraxinus ornus</i> L. subsp. <i>ornus</i>	20	70	100	100
Geophytes	2	5	7	4	X	7	7	<i>Galanthus nivalis</i> L.	10	0	0	0
Therophytes	3	6	X	5	4	5	5	<i>Galium aparine</i> L.	20	10	0	0
Hemicryptophytes	3	11	8	4	2	6	2	<i>Galium corrudifolium</i> Vill.	10	30	30	20
Geophytes	1	2	5	4	5	X	5	<i>Galium odoratum</i> (L.) Scop.	0	0	10	10
Hemicryptophytes	3	7	6	6	4	7	3	<i>Galium verum</i> L. subsp. <i>verum</i>	0	10	0	0
Chamaephytes	3	5	6	5	5	3	3	<i>Genista tinctoria</i> L.	0	0	0	20
Hemicryptophytes	3	9	3	6	4	7	2	<i>Gentiana dinarica</i> Beck	0	10	0	0

Allegrezza M, Pesaresi S, Ballelli S, Tesei G, Ottaviani C (2020).

**Effects of old *Pinus nigra* reforest plantation on the floristic-vegetational composition along an elevation gradient (central Apennines, Italy)**

iForest – Biogeosciences and Forestry – doi: [10.3832/ifor3215-013](https://doi.org/10.3832/ifor3215-013)

Biological form	SBT	EIV						Species	Frequency (%)			
		L	T	C	U	R	N		UN	UR	LR	LN
Hemicryptophytes	3	7	7	5	4	5	4	<i>Geranium pyrenaicum</i> Burm.f. subsp. <i>pyrenaicum</i>	20	0	0	0
Hemicryptophytes	2	4	5	5	5	6	7	<i>Geum urbanum</i> L.	20	0	10	40
Hemicryptophytes	3	8	6	5	3	7	1	<i>Globularia bisnagarica</i> L.	0	0	20	0
Chamaephytes	3	11	X	4	2	9	1	<i>Globularia meridionalis</i> (Podp.) O.Schwarz	0	10	20	0
Geophytes	1	5	4	7	4	3	3	<i>Goodyera repens</i> (L.) R.Br.	0	20	10	0
Phanerophytes	2	4	5	4	5	X	X	<i>Hedera helix</i> L. subsp. <i>helix</i>	10	0	50	60
Chamaephytes	3	9	X	6	4	7	2	<i>Helianthemum nummularium</i> (L.) Mill. subsp. <i>obscurum</i> (Celak.) Holub	0	10	10	20
Chamaephytes	3	9	7	4	2	7	2	<i>Helianthemum oelandicum</i> (L.) Dum.Cours. subsp. <i>incanum</i> (Willk.) G.López	0	0	10	0
Chamaephytes	5	5	6	4	4	8	3	<i>Helleborus foetidus</i> L. subsp. <i>foetidus</i>	20	0	10	40
Geophytes	2	5	5	4	6	7	6	<i>Helleborus viridis</i> L. subsp. <i>bocconeii</i> (Ten.) Peruzzi	10	0	20	20
Geophytes	2	4	6	4	4	7	X	<i>Hepatica nobilis</i> Mill.	50	20	20	40
Hemicryptophytes	4	7	4	4	3	7	3	<i>Heracleum sphondylium</i> L. subsp. <i>pyrenaicum</i> (Lam.) Bonnier & Layens	0	10	0	0
Hemicryptophytes	3	8	X	5	4	8	2	<i>Hieracium bifidum</i> Kit. ex Hornem. (s.l.)	0	10	0	10
Hemicryptophytes	3							<i>Hieracium grovesianum</i> Arv.-Touv. ex Belli (s.l.)	0	0	10	0
Hemicryptophytes	2	4	X	4	5	5	X	<i>Hieracium murorum</i> L. (s.l.)	60	40	20	10
Hemicryptophytes	3							<i>Hieracium pseudogrovesianum</i> Gottschl. (s.l.)	0	10	0	0
Hemicryptophytes	2	4	4	4	6	4	4	<i>Hieracium racemosum</i> Waldst. & Kit. ex Willd. (s.l.)	0	10	10	0
Hemicryptophytes	3							<i>Hieracium</i> sp.	0	10	0	0
Hemicryptophytes	3	7	4	4	3	3	2	<i>Hieracium tomentosum</i> L. subsp. <i>tommentosum</i>	0	10	0	0
Hemicryptophytes	3	9	2	5	3	7	2	<i>Hieracium villosum</i> Jacq. (gruppo)	0	10	0	0
Hemicryptophytes	2	5	6	4	4	6	3	<i>Hypericum montanum</i> L.	10	0	0	10
Hemicryptophytes	3	7	8	6	X	X	X	<i>Hypericum perforatum</i> L. subsp. <i>perforatum</i>	10	10	30	0
Hemicryptophytes	3	6	6	4	4	7	3	<i>Inula conyzae</i> (Griess.) DC.	0	0	10	20
Hemicryptophytes	3	6	6	6	3	8	3	<i>Inula hirta</i> L.	0	20	0	0
Phanerophytes	3	8	0	0	4	0	4	<i>Juniperus communis</i> L.	50	70	50	30
Nanophanerophytes	3	8	5	7	4	5	3	<i>Juniperus communis</i> L. subsp. <i>hemisphaerica</i> (J. Presl et C. Presl) Nyman	10	0	0	0
Nanophanerophytes	3	8	2	7	4	7	2	<i>Juniperus communis</i> L. subsp. <i>nana</i> Syme	20	0	0	0
Phanerophytes	3	8	8	0	3	0	2	<i>Juniperus deltoides</i> R.P.Adams	0	20	50	30
Hemicryptophytes	3	5	7	7	4	7	3	<i>Katapsuxis silaifolia</i> (Jacq.) Reduron, Charpin & Pimenov	0	10	0	0
Hemicryptophytes	3	7	4	4	4	X	2	<i>Knautia calycina</i> (C.Presl) Guss.	10	10	10	20
Therophytes	3	7	8	5	3	3	2	<i>Knautia integrifolia</i> (L.) Bertol. subsp. <i>integrifolia</i>	0	0	10	0
Phanerophytes	2	5	6	6	5	7	7	<i>Laburnum anagyroides</i> Medik. subsp. <i>anagyroides</i>	10	10	0	20
Hemicryptophytes	5	5	5	5	4	7	2	<i>Lamium garganicum</i> L. (s.l.)	10	0	0	0
Therophytes	2	5	X	5	5	X	7	<i>Lapsana communis</i> L. subsp. <i>communis</i>	10	0	0	0
Phanerophytes	4	8	3	9	4	0	3	<i>Larix decidua</i> Mill.	0	0	10	0
Hemicryptophytes	3	7	5	7	3	7	2	<i>Laserpitium siler</i> L. subsp. <i>siculum</i> (Spreng.) Santangelo, F. Conti et Gubellini	20	30	0	0
Therophytes	4	6	6	5	3	X	X	<i>Lathyrus aphaca</i> L. subsp. <i>aphaca</i>	0	0	0	10
Hemicryptophytes	3	7	5	X	6	7	6	<i>Lathyrus pratensis</i> L. subsp. <i>pratensis</i>	0	10	0	0

**Effects of old *Pinus nigra* reforest plantation on the floristic-vegetational composition along an elevation gradient (central Apennines, Italy)**iForest – Biogeosciences and Forestry – doi: [10.3832/ifer3215-013](https://doi.org/10.3832/ifer3215-013)

Biological form	SBT	EIV						Species	Frequency (%)			
		L	T	C	U	R	N		UN	UR	LR	LN
Hemicryptophytes	3	7	5	6	4	4	4	<i>Lathyrus sylvestris</i> L. subsp. <i>sylvestris</i>	0	0	10	10
Geophytes	2	4	7	6	5	7	7	<i>Lathyrus venetus</i> (Mill.) Wohlf.	10	0	0	30
Hemicryptophytes	3	8	X	4	4	X	3	<i>Leontodon hispidus</i> L. subsp. <i>hispidus</i>	0	0	10	0
Nanophanerophytes	2	7	6	4	X	8	X	<i>Ligustrum vulgare</i> L.	0	0	0	10
Geophytes	3	6	4	4	6	X	X	<i>Lilium bulbiferum</i> L. subsp. <i>croceum</i> (Chaix) Jan	10	10	20	10
Geophytes	3	5	X	5	4	7	5	<i>Lilium martagon</i> L.	0	10	0	10
Geophytes	2	X	7	5	4	8	0	<i>Limodorum abortivum</i> (L.) Sw.	0	0	0	10
Phanerophytes	2	6	5	6	6	X	5	<i>Lonicera caprifolium</i> L.	10	40	10	70
Phanerophytes	2	7	8	5	3	6	4	<i>Lonicera etrusca</i> Santi	0	0	40	0
Phanerophytes	2	5	5	4	5	7	X	<i>Lonicera xylosteum</i> L.	0	0	10	90
Hemicryptophytes	3	7	X	5	4	7	2	<i>Lotus corniculatus</i> L. subsp. <i>corniculatus</i>	0	10	20	20
Hemicryptophytes	2	4	7	5	4	4	5	<i>Luzula forsteri</i> (Sm.) DC.	0	0	10	30
Hemicryptophytes	2	3	3	4	5	2	3	<i>Luzula sylvatica</i> (Huds.) Gaudin subsp. <i>sieberi</i> (Tausch) K.Richt.	0	30	0	0
Hemicryptophytes	1	4	4	5	6	2	5	<i>Luzula sylvatica</i> (Huds.) Gaudin subsp. <i>sylvatica</i>	20	0	10	0
Phanerophytes	2	7	5	5	5	7	5	<i>Malus sylvestris</i> (L.) Mill.	0	0	0	30
Therophytes	3	7	5	X	4	8	7	<i>Medicago lupulina</i> L.	0	10	0	0
Hemicryptophytes	4	8	5	7	3	9	3	<i>Medicago sativa</i> L.	0	0	10	0
Hemicryptophytes	2	3	5	5	5	6	X	<i>Melica uniflora</i> Retz.	10	0	10	30
Hemicryptophytes	2	5	6	5	4	7	3	<i>Melittis melissophyllum</i> L. subsp. <i>melissophyllum</i>	10	0	0	40
Therophytes	2	4	5	5	5	6	7	<i>Moehringia trinervia</i> (L.) Clairv.	20	0	0	0
Geophytes	2	3	4	5	4	4	0	<i>Monotropa hypopitys</i> L.	10	10	0	0
Hemicryptophytes	2	4	5	4	5	X	6	<i>Mycelis muralis</i> (L.) Dumort. subsp. <i>muralis</i>	30	40	0	0
Hemicryptophytes	2	5	X	5	6	X	7	<i>Myosotis sylvatica</i> Hoffm. (s.l.)	0	10	0	0
Geophytes	2	2	5	5	5	7	5	<i>Neottia nidus-avis</i> (L.) Rich.	30	40	10	10
Geophytes	2	4	4	5	6	7	5	<i>Neottia ovata</i> (L.) Bluff & Fingerh.	20	10	10	0
Chamaephytes	3	7	8	6	3	8	2	<i>Onosma echioides</i> (L.) L. subsp. <i>echioides</i>	10	0	10	0
Geophytes	5	5	7	5	4	8	X	<i>Orchis purpurea</i> Huds.	10	10	0	0
Hemicryptophytes	3	6	6	4	3	X	2	<i>Oreoselinum nigrum</i> Delarbre	0	10	0	0
Geophytes	3	5	6	5	5	7	5	<i>Ornithogalum umbellatum</i> L.	0	0	0	20
Chamaephytes	1	4	5	4	5	X	2	<i>Orthilia secunda</i> (L.) House	0	90	0	0
Phanerophytes	2	4	8	4	4	X	X	<i>Ostrya carpinifolia</i> Scop.	20	40	40	100
Nanophanerophytes	3	7	8	5	3	4	2	<i>Osyris alba</i> L.	0	0	10	0
Chamaephytes	3	7	5	4	2	4	1	<i>Petrosedum rupestre</i> (L.) P.V.Heath	0	0	10	30
Geophytes	3	8	5	4	5	8	7	<i>Phleum hirsutum</i> Honck. subsp. <i>ambiguum</i> (Ten.) Cif. & Giacom.	0	0	0	30
Phanerophytes	4							<i>Picea abies</i> (L.) H.Karst.	0	0	10	0
Hemicryptophytes	3	8	X	5	4	8	4	<i>Picris hieracioides</i> L. subsp. <i>hieracioides</i>	0	10	10	0
Hemicryptophytes	3	8	X	4	3	4	2	<i>Pilosella officinarum</i> Vaill.	0	10	20	10
Hemicryptophytes	3	8	6	6	3	7	2	<i>Pilosella piloselloides</i> (Vill.) Soják (s.l.)	0	10	0	0
Hemicryptophytes	3	7	8	5	3	5	2	<i>Pimpinella peregrina</i> L.	0	0	10	0
Hemicryptophytes	3	7	X	5	3	X	2	<i>Pimpinella saxifraga</i> L. subsp. <i>saxifraga</i>	0	10	10	0
Phanerophytes	4	7	7	4	2	9	2	<i>Pinus nigra</i> J.F.Arnold subsp. <i>nigra</i>	10	100	100	20



**Effects of old *Pinus nigra* reforest plantation on the floristic-vegetational composition along an elevation gradient (central Apennines, Italy)**iForest – Biogeosciences and Forestry – doi: [10.3832/ifer3215-013](https://doi.org/10.3832/ifer3215-013)

Biological form	SBT	EIV						Species	Frequency (%)			
		L	T	C	U	R	N		UN	UR	LR	LN
Hemicryptophytes	4	6	7	5	X	X	X	<i>Plantago lanceolata</i> L.	0	0	10	0
Geophytes	2	6	X	5	5	7	X	<i>Platanthera bifolia</i> (L.) Rich.	0	10	0	0
Hemicryptophytes	3							<i>Poa angustifolia</i> L.	0	0	0	20
Hemicryptophytes	2	5	X	5	5	5	3	<i>Poa nemoralis</i> L. subsp. <i>nemoralis</i>	30	0	0	20
Hemicryptophytes	3	6	X	X	5	X	X	<i>Poa pratensis</i> L. subsp. <i>pratensis</i>	0	0	0	10
Chamaephytes	3	6	X	5	3	8	3	<i>Polygala chamaebuxus</i> L.	10	10	0	0
Geophytes	2	2	5	5	5	7	4	<i>Polygonatum multiflorum</i> (L.) All.	10	0	0	0
Hemicryptophytes	2	5	X	4	X	2	X	<i>Polypodium vulgare</i> L.	0	0	0	20
Phanerophytes	5	6	5	5	5	X	X	<i>Populus tremula</i> L.	0	10	0	0
Hemicryptophytes	5	5	6	5	4	8	4	<i>Potentilla micrantha</i> Ramond ex DC.	0	0	0	20
Hemicryptophytes	3							<i>Poterium sanguisorba</i> L. subsp. <i>balearicum</i> (Bourg. ex Nyman) Stace	0	10	10	0
Hemicryptophytes	2	6	5	4	5	7	5	<i>Primula vulgaris</i> Huds. subsp. <i>vulgaris</i>	10	30	10	30
Phanerophytes	4	4	5	6	5	7	5	<i>Prunus avium</i> (L.) L.	10	20	20	0
Phanerophytes	4	9	7	5	5	5	5	<i>Prunus cerasifera</i> Ehrh.	0	0	0	10
Phanerophytes	3	7	5	6	3	8	2	<i>Prunus mahaleb</i> L. subsp. <i>mahaleb</i>	0	0	40	30
Phanerophytes	5	7	5	5	X	X	X	<i>Prunus spinosa</i> L. subsp. <i>spinosa</i>	0	0	40	60
Hemicryptophytes	5	6	7	6	6	7	3	<i>Pseudoturritis turrita</i> (L.) Al-Shehbaz	20	20	0	0
Geophytes	3	6	5	4	6	3	3	<i>Pteridium aquilinum</i> (L.) Kuhn subsp. <i>aquilinum</i>	0	0	10	10
Hemicryptophytes	3	5	5	6	4	7	3	<i>Ptilostemon strictus</i> (Ten.) Greuter	0	0	10	0
Phanerophytes	5	6	5	5	6	7	7	<i>Pyrus communis</i> L. subsp. <i>pyraster</i> (L.) Ehrh.	0	10	20	20
Phanerophytes	2	6	8	5	4	4	4	<i>Quercus cerris</i> L.	10	40	40	50
Phanerophytes	2	2	9	4	3	X	X	<i>Quercus ilex</i> L. subsp. <i>ilex</i>	0	10	60	30
Phanerophytes	2	7	8	6	3	7	4	<i>Quercus pubescens</i> Willd. subsp. <i>pubescens</i>	10	40	70	100
Phanerophytes	3	7	5	6	3	9	2	<i>Rhamnus saxatilis</i> Jacq.	0	20	0	0
Nanophanerophytes	2	5	5	5	5	7	5	<i>Rosa arvensis</i> Huds.	10	10	0	20
Nanophanerophytes	5	8	5	5	4	X	X	<i>Rosa canina</i> L.	0	30	10	60
Nanophanerophytes	2	7	5	5	7	7	9	<i>Rubus caesius</i> L.	10	0	30	30
Nanophanerophytes	5	7	7	5	4	0	5	<i>Rubus canescens</i> DC.	0	0	0	20
Nanophanerophytes	5	7	6	4	4	5	7	<i>Rubus hirtus</i> Waldst. & Kit. group	0	10	20	0
Nanophanerophytes	5	5	8	5	4	5	8	<i>Rubus ulmifolius</i> Schott	0	0	40	20
Geophytes	2	4	8	5	4	5	5	<i>Ruscus aculeatus</i> L.	0	0	0	40
Hemicryptophytes	1	4	5	5	5	8	6	<i>Sanicula europaea</i> L.	10	40	30	30
Chamaephytes	3	8	6	6	3	7	2	<i>Satureja montana</i> L. subsp. <i>montana</i>	0	0	0	10
Hemicryptophytes	3	8	5	5	4	8	2	<i>Scabiosa columbaria</i> L. subsp. <i>columbaria</i>	0	0	10	20
Hemicryptophytes	3	8	2	5	5	8	3	<i>Senecio doronicum</i> (L.) L.	10	0	0	0
Therophytes	4	9	7	5	2	5	1	<i>Senecio inaequidens</i> DC.	0	0	20	0
Hemicryptophytes	4	7	7	7	3	7	2	<i>Seseli tommasinii</i> Rehb.f.	10	0	0	0
Hemicryptophytes	3	10	4	4	2	7	4	<i>Sesleria apennina</i> Ujhelyi	0	10	0	0
Hemicryptophytes	3	3	5	6	5	6	7	<i>Sesleria autumnalis</i> (Scop.) F.W.Schultz	10	0	0	0
Hemicryptophytes	3	11	5	4	2	6	1	<i>Sesleria nitida</i> Ten. subsp. <i>nitida</i>	30	70	30	30
Hemicryptophytes	4	7	5	5	6	7	8	<i>Silene dioica</i> (L.) Clairv.	10	0	0	0

**Effects of old *Pinus nigra* reforest plantation on the floristic-vegetational composition along an elevation gradient (central Apennines, Italy)**iForest – Biogeosciences and Forestry – doi: [10.3832/ifor3215-013](https://doi.org/10.3832/ifor3215-013)

Biological form	SBT	EIV						Species	Frequency (%)			
		L	T	C	U	R	N		UN	UR	LR	LN
Hemicryptophytes	3	5	7	5	4	6	5	<i>Silene italica</i> (L.) Pers. subsp. <i>italica</i>	10	10	10	50
Hemicryptophytes	4	8	X	X	4	X	7	<i>Silene latifolia</i> Poir.	10	0	0	0
Hemicryptophytes	4							<i>Silene vulgaris</i> (Moench) Garcke subsp. <i>tenoreana</i> (Colla) Soldano & F.Conti	0	0	10	0
Hemicryptophytes	4	8	X	X	4	7	2	<i>Silene vulgaris</i> (Moench) Garcke subsp. <i>vulgaris</i>	0	0	0	10
Hemicryptophytes	2	5	X	X	5	X	5	<i>Solidago virgaurea</i> L. subsp. <i>virgaurea</i>	20	50	20	20
Phanerophytes	5	6	5	5	4	7	3	<i>Sorbus aria</i> (L.) Crantz	40	70	50	60
Phanerophytes	1	6	X	X	X	X	X	<i>Sorbus aucuparia</i> L. subsp. <i>aucuparia</i>	0	10	0	0
Phanerophytes	2	4	7	5	3	8	3	<i>Sorbus domestica</i> L.	0	0	20	50
Phanerophytes	2	4	6	5	4	7	4	<i>Sorbus torminalis</i> (L.) Crantz	0	0	10	30
Hemicryptophytes	2	4	X	4	7	7	7	<i>Stachys sylvatica</i> L.	0	0	10	0
Therophytes	4	5	7	5	5	8	6	<i>Stellaria media</i> (L.) Vill. subsp. <i>media</i>	0	10	0	0
Hemicryptophytes	3	7	6	5	2	8	1	<i>Tanacetum corymbosum</i> (L.) Sch.Bip. subsp. <i>achilleae</i> (L.) Greuter	0	20	10	0
Chamaephytes	3	8	7	5	1	8	2	<i>Teucrium chamaedrys</i> L. subsp. <i>chamaedrys</i>	10	40	70	50
Chamaephytes	3							<i>Thymus longicaulis</i> C.Presl subsp. <i>longicaulis</i>	0	10	0	10
Hemicryptophytes	3	7	5	4	3	6	3	<i>Trifolium montanum</i> L. subsp. <i>rupestre</i> (Ten.) Nyman	0	10	0	0
Hemicryptophytes	5	7	X	6	3	8	2	<i>Trifolium ochroleucon</i> Huds.	0	10	10	0
Hemicryptophytes	3	7	5	6	4	8	2	<i>Trifolium pratense</i> L. subsp. <i>pratense</i>	10	0	0	0
Hemicryptophytes	3	7	X	4	X	X	X	<i>Trifolium repens</i> L.	0	0	0	10
Hemicryptophytes	3	8	X	X	X	X	7	<i>Trifolium rubens</i> L.	0	0	10	10
Phanerophytes	5	7	0	4	3	8	0	<i>Ulmus minor</i> Mill. subsp. <i>minor</i>	0	0	0	10
Hemicryptophytes	3	5	7	5	X	8	X	<i>Veronica chamaedrys</i> L. subsp. <i>chamaedrys</i>	0	10	0	10
Therophytes	4	6	X	6	4	X	X	<i>Veronica hederifolia</i> L.	0	10	0	0
Hemicryptophytes	2	7	5	5	4	8	5	<i>Viburnum lantana</i> L.	30	40	0	0
Hemicryptophytes	3	7	X	X	5	X	X	<i>Vicia cracca</i> L.	0	10	0	0
Hemicryptophytes	3	7	6	5	4	4	5	<i>Vicia dasycarpa</i> Ten.	0	10	0	0
Hemicryptophytes	2	7	8	6	3	5	4	<i>Vicia grandiflora</i> Scop.	0	0	0	10
Hemicryptophytes	3	X	4	5	5	7	5	<i>Vicia sepium</i> L.	10	0	0	0
Hemicryptophytes	5	6	5	5	3	7	3	<i>Vincetoxicum hirundinaria</i> Medik. subsp. <i>hirundinaria</i>	0	0	10	0
Hemicryptophytes	2	5	8	5	5	7	6	<i>Viola alba</i> Besser subsp. <i>dehnhardtii</i> (Ten.) W.Becker	10	20	70	60
Hemicryptophytes	3	11	4	3	2	7	1	<i>Viola eugeniae</i> Parl.	0	10	0	0
Hemicryptophytes	2	4	5	4	4	8	X	<i>Viola mirabilis</i> L.	0	30	0	0
Hemicryptophytes	1	4	5	4	5	7	6	<i>Viola reichenbachiana</i> Jord. ex Boreau	30	40	0	20