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*Alpine home gardens in the Western Italian Alps: the role of gender on the local
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Alpine home gardens in the Western Italian Alps: role of gender on the local agro-biodiversity and its management

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1 Abstract

2 Home gardens are reservoirs of biodiversity, promoting food security and maintaining farm
3 ecosystem processes. A study on alpine home gardens was conducted in two alpine valleys in
4 Piedmont, North-Western Italy. Forty semi-structured interviews with garden managers were
5 gathered. We analysed if gender roles affect the agro-biodiversity and the management of the alpine
6 home gardens in the Western Italian Alps. The results show that mixed couples (consisting of man
7 and woman) present higher diversity of managements and a higher number of taxa detected. 138
8 taxa were detected 138 taxa among couples, 82 among male gardeners and 69 among female
9 gardeners. Indeed, when the vegetable garden is managed by men only, more than half of the taxa
10 are represented by horticultural species. On the other hand, when the vegetable garden is managed
11 by women only, flowering species, wild and semi-wild species represent a relevant percentage of
12 the total number of mentioned taxa. Despite most of the literature emphasized the great role of
13 women in biodiversity conservation and traditional ecological knowledge keeping, this study
14 showed that the compresence of men and women appears to increase the level of biodiversity and
15 diversity in managements many variables of alpine home gardens.

16 Keywords

17 Marginal agriculture– Food security - Foraging– Tradition ecological knowledge - Cultural identity

18 Introduction

19 Home gardens can play a key role not only in biodiversity conservation but they also promote food
20 security and maintain farm ecosystem processes. Many studies have been carried out on home
21 gardens in tropical areas focusing on their biodiversity (Lamont et al.1999; Kehlenbeck and Maass
22 2004; Albuquerque et al. 2005; Sunwar et al. 2006; Kabir and Webb 2007; Galluzzi et al. 2010, Das
23 and Das 2015; Caballero-Serrano et al. 2016), on the role they play in food security (Montagnini
24 2006; Márquez and Schwartz 2008; Gray et al. 2013), the role they play in cultural identity, sense
25 of belonging (Bhatti and Church 2001; Perreault 2005; Bhatti 2006; Ghazali 2013), their resilience
26 (Wezel and Bender 2003; Aguilar-Støen et al. 2008; Van der Stege et al. 2012); their socio-
27 ecological and cultural importance (Trinh et al. 2003; Buchmann 2009).

28 Much less literature is available about home gardens in Europe. Calvet Mir (2011) led back this
29 phenomenon to the massive emigration from rural areas occurred in the last decays and the
30 consequent marginality of the European home gardens. Nevertheless, in the last fifteen years more
31 scientific papers on European home gardens have been published especially in Iberian peninsula

32 (Agelet, Bonet and Vallés 2000; Calvet-Mir et al. 2012; Reyes-García et al. 2010;2013;2014; Riu-
33 Bosoms et al. 2014), in Austria (Vogl and Vogl-Lukasser 2003; Vogl-Lukasser et al. 2010), in
34 Romania (Papp et al. 2012) in Hungary (Birol et al. 2005), and in Portugal (Carvalho 2016).

35 Few papers analysed home gardens from a gender perspective. As highlighted in Shiva (1995), both
36 men and women of rural areas have deep traditional knowledge. However, men and women grow
37 and deepen their knowledge on different species categories (Luoga et al. 2000; Trinh et al. 2003;
38 Voeks 2007; Carvalho 2016, Ciftcioglu 2017). Indeed, home gardens are hotspots of agro
39 biocultural diversity (Saluzzi et al. 2010) and growing a home garden is not only producing tangible
40 goods but it also a cultural space where traditional knowledge can be actively conserved (Linares
41 and Eyzaguirre 2004). This knowledge is often kept by women, who are considered as biodiversity
42 guardians (Howard 2003). Many studies explored how women play a more important role in
43 preserving biodiversity when compared to men (Agrawal 2003; Vogl-Lukasser et al. 2010; Reyes-
44 Garcia et al. 2010; Calvet-Mir et al. 2011). Specifically, Anderson (2003) explained that the value
45 of the home gardens' products is not only economic. Women play a major role also in neglected
46 (and thus, not economically valued) species as wild and semi-wild plants which are crucial in
47 maintaining biodiversity and food security (Howard 2003; Vogl-Lukasser et al. 2010). However,
48 many researches emphasized that men and women are often both responsible for the management
49 of the home garden, but they are involved in different tasks (Chambers and Momsen 2007; Reyes-
50 Garcia et al. 2010).

51 In this study, we analysed if gender roles affect the agro-biodiversity and the management of the
52 alpine home gardens in the Western Italian Alps.

53 Specifically, we aimed at:

- 54 - determine if gender influences agricultural practices in alpine home gardens.
- 55 - determine which group of *taxa* (A tree and shrubs; B horticultural species; C flower species
56 cultivated for aesthetic purposes; D wild and semi wild; E cereal and pseudocereal) is used
57 by which gender category (female only, male only; male and female)
- 58 - intersect these data

60 **Material and Methods**

61 Forty interviews were gathered in two alpine valleys in Piedmont, North Western Italy.
62 Specifically, in the Po Valley (municipalities of Ostana and Oncino) and in the Pellice Valley
63 (municipality of Rorà). Data were gathered during spring 2013 through semi-structured interviews
64 with garden managers who fulfil the following requirements:

- 65 - own a vegetable garden above 900 m a.s.l. in the municipality of Rorà, Ostana, Oncino;
- 66 - have know-how on vegetable garden management;
- 67 - live at least one month per year in one of the municipalities listed above.

68 The Pellice valley and specifically Rorà is characterized by a population of 250 people and it is
69 located at 1000 m a.s.l. Most of the inhabitants worked in the Po plain. Only a few of them worked
70 in the municipality in agricultural activities. There is little tourism and it influences positively the
71 landscape conservation (Mourglia 1901; Tourn 2002, 2003; Regione Piemonte 2003).

72 In the Po valley, there is the source of Po river and there is one of the highest mountains in Europe,
73 the Monviso. Oncino and Ostana, the two sites of the case study are located respectively on the
74 orographic right and on the orographic left at an altitude of around 1200 m a.s.l. Ostana and Oncino
75 have about 80 inhabitants each, but only a few of them (around 20 each) live permanently in the
76 municipalities. The tortuous and long road to get to the plain does not allow daily transfers to work
77 in denser populated areas. This means that the permanent residents are all retired and consequently
78 the sample is characterized by elder people. The territory is also characterized by the transhumance
79 during summer time in the mountain pasture (*meire*) above 1500 m a.s.l.

80 The methodological approach included quali-quantitative analysis through participatory
81 observation. Qualitative data were gathered in a semi-structured interview, while data regarding
82 plants of the gardens were collected through free listing method. Most of the interviews are
83 conducted within the vegetable gardens, in a way to facilitate the plant enumeration. Some
84 questions also regarded the management and were measured by the degree the gardeners do agree
85 with the following statements: comply with the lunar cycle; use chemical products; apply manure;
86 make compost; use flowering species for aesthetic purposes; the flowering species are planted
87 within the garden; use of tree species for aesthetic purposes; garden as a hobby; productivity is not
88 the only goal; farm organically; breed animals.

89 All *taxa* were recorded and were subdivided into five categories: A. tree and shrubs *taxa*; B.
90 horticultural *taxa*; C. *taxa* of flowering species cultivated for aesthetic purposes; D. wild and semi-
91 wild *taxa*; E. cereal and pseudocereal *taxa*. Moreover, ten questions were asked regarding the

92 management, the reason for gardening, the know-how and the way they learnt it. Per each question,
93 a value between 0 and 1 is assigned. 0 means the interviewed does not agree or does not apply this
94 method; 0,5 means the interviewed does partially agree or partially applies the method; 1 means the
95 interviewed does agree or applies the method.

96 The sample consists of 40 vegetable gardens of which 8 are managed by women only (F), 14 are
97 managed by men only (M) and 18 are managed by couples, men and women (MF). The average age
98 of the interviewed is 68 for the Po valley and 63 for the Pellice valley. More than 80% of the
99 interviewed declare to be originally from the same valley.

100

101 **Results**

102 The results (Fig 1) show a remarkable different management depending on gender. Agricultural
103 practices were grouped into three main categories: agroecological practices (“agricultural practices
104 aiming to produce significant amounts of food, which valorise in the best way ecological processes
105 and ecosystem services in integrating them as fundamental elements in the development of the
106 practices” Wezel et al. 2014, p.3); cultural practices (regarding sense of beauty and well-being);
107 social factors (regarding the role the garden play in managers’ life)

108 Management Agroecological practices

109 The lunar cycle is taken into consideration mostly by men and couples. This is probably due to a
110 higher expectation on productivity. They believe that when planting or sowing vegetables who
111 grow down in the soil (like roots and tubers) the moon should be waning, while in the others
112 vegetables who grow upward in the crescent moon.

113 Manure application is considered as a heavy work. Nevertheless, more women use this method of
114 fertilization. In fact, women who breed chickens also apply their manure to the home garden, as a
115 way to use an output as an input. Gardeners also reported to get manure once a year by the cow
116 shepherds (*marghè*) who graze the mountain pasture during summer time. Another mentioned
117 method consists of incorporating deer feces naturally deposited around the garden as manure.
118 Compost making is a wide spread technique. It is mainly pursued by women because it is
119 considered as part of the home realm. This explained why when home gardens are farmed by men

120 only compost appears less used. Use of chemical products is very high when the farmer is a woman.
121 This is due to the age of the interviewed (mostly above 60 years old) and the intensity of work
122 required by the garden. Using chemicals is clearly a way to avoid heavy tasks. This is very evident;
123 when the woman is not alone but in a couple, the use of chemicals is very low.

124 Animal breeding included chickens, cows, and goats. Poultry is mainly women domain, they are
125 sometimes fed with kitchen waste and they do not require any masculine labour. Cows and goats
126 are mainly kept some by transhumant shepherds and some local farmers. Organic gardens are not
127 wide spread. This is because in these valleys there is still a traditional farming, a way of cultivating
128 "as my grandparents used to do". There are few home gardeners who have knowledge on the
129 distinction between organic and conventional agriculture.

130 Management Cultural practices

131 Aesthetics is also an important issue, the totality of the women affirmed to use flowering species for
132 improving the sense of beauty, most of women also declared to incorporate them into the home
133 garden. When gardeners are men only there are less flowers in general and much less within the
134 garden which is supposed to be more productive and less aesthetic. The datum regarding the use of
135 tree species for aesthetic purposes shows how men and women gardeners can improve their home
136 garden when farming together. Trees are appreciated by men for their productivity and by women
137 for the shade and their intrinsic beauty.

138 Management Social factors

139 Gardening is generally considered as a hobby by men, definitely not for women. To women, it
140 means fresh good food at the doorstep, for men is mainly a way to spend their time efficiently and
141 productively. For this reason, when couples work together in their home gardens they do consider
142 gardening as a hobby, but it is at the same time productive and recreational.

143 Species and Gender

144 Figure 2 shows that mixed couples (MF) present a higher level of records per plant group (except
145 for category E). Moreover, women (F) appear to have a deeper knowledge of wild and semi-wild
146 species when compared with men (M). Regarding cereals and pseudocereals (category E) men
147 appear to be the main responsible for this cultivation. It can also be observed that women are less
148 prone to cultivate vegetables. Considering the others categories (A,C,D), men and women show
149 similar values. MF group has the highest number of taxa per each category (except for E) and this is
150 probably due to the complementarity of the M and F groups skills.

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3 151 Table 1 shows that MF group has a higher level of diversification of records if compared with F and
4 152 M, showing a higher level of biodiversity by complementing knowledge from both genders. This is
5 153 true for categories A, B, C and D, while for E, M group has the highest level of diversification.
6 154 Results above show that the mixed group is able to reduce the differences between the gardens
7 155 managed by men and women. When the vegetable garden is managed by men the percentage of
8 156 horticultural species (B) is more than 50%. The percentage decreases when the management is
9 157 promiscuous and even more, when only women cultivate it. The opposite occurs when flowering
10 158 species (C) are considered. When the vegetable garden is managed by women only the percentage
11 159 of flower species (C) is very high, when the management is promiscuous it slightly decreases and it
12 160 is even lower when the garden is cultivated by men only.

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19 161 Among couples (MF) were detected 138 *taxa*, while 82 among male (M) gardeners (30% less) and
20 162 69 among female(F), gardeners (50% less). List of mentioned *taxa* is reported in table 2.

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24 25 164 **Discussion**

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28 165 A large part of the literature showed that women increase the biodiversity (Hoogerbrugge and
29 166 Fresco 1993; Agrawal 2003; Vazzana et al. 2010; Calvet-Mir et al. 2011) and enrich the vegetable
30 167 garden with flower species (Reyes-Garcia et al. 2010), wild and semi-wild species (Vogl-Lukasser
31 168 et al. 2010). In this study, we observed that when the alpine home garden is managed by a couple
32 169 (man and woman) the number of landraces is significantly higher (=138 *taxa*) than in the other two
33 170 cases (F= 74 *taxa*; M= 88 *taxa*). This can be observed in 4 out of 5 plant categories we created (in
34 171 A: tree and shrubs *taxa*; B: horticultural *taxa*; C: *taxa* of flower species cultivated for aesthetic
35 172 purposes; D: wild and semi-wild *taxa*; but not in E: cereal and pseudocereal *taxa*). Indeed, men are
36 173 generally more interested in the species who have market value, while women mainly aim at their
37 174 culinary and nutritional value (Balakrishnan 1999). This can be observed in the horticultural
38 175 category (B) who have a higher market value and shows higher number of *taxa* for men. It is in line
39 176 with some recent studies by Ciftcioglu (2017), who reported that male respondents valued the
40 177 opportunity to grow horticultural species (B) more than the women, while female respondents
41 178 tended to value more ornamental plants (C). Also, women are greater foragers of products from
42 179 common-pool resources (Agrawal 2003). Indeed, women are often responsible for foraging and
43 180 gathering (Howard-Borjas and Cuijpers 2002), especially if wild and semi wild plants are close to
44 181 houses and home-gardens. On the other hand, the gathering of wild species that grow at very high
45 182 altitude or in places hard to get, like *Artemisia absinthium*, it is a man's prerogative (Ertug 2003).

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3 183 The wild species have been essential during the famine in each Occitan valley of Italian Alps and
4 184 the persistence of traditional knowledge regarding these species is the proof of their basic role in the
5 185 food security (Mattalia et al. 2012). Having good traditional knowledge on wild and semi-wild
6 186 species, also means transferring non-cultivated biodiversity from the field to the plate. This is not
7 187 only an important task in the domestic realm, but also an active way to preserve biodiversity and its
8 188 traditional knowledge. Furthermore, the Alpine home garden could preserve safeguarded species
9 189 (particularly for semi-wild species). For instance, some managers reported the presence within their
10 190 home gardens of *Lilium martagon*, *Lilium croceum* and some Gentianaceae which are totally
11 191 safeguarded species (Regione Piemonte 2009). The responsible for this contamination is mainly
12 192 woman who, not only insert the wild in the domesticated, but they create the habitat to allow rare
13 193 not-welcomed plant to grow (Vogl-Lukasser et al. 2010).

14 194 Another important aspect regards the aesthetics within the garden. Recreating a sense of beauty, a
15 195 sense of belonging, a sense of place is generally considered a women task. By decorating the house
16 196 and the adjacent external areas, the woman incorporates ornamental biodiversity. Men did not value
17 197 the use of ornamental (“useless”) plants (Carvalho 2016). Cultivating primly the home garden,
18 198 women create surplus value to the functionality of the horticultural species planted by men. Gardens
19 199 become a reason for pride and satisfaction (Heckler 2004), exchange, perpetration of the cultural
20 200 identity and expression of its own subjectivity (Murrieta and WinklerPrins 2009). Moreover,
21 201 women take care of the nutritional point of view (in addition to the medical one) since they know
22 202 the properties of the plant (Daniggelis 2003). As in the results, the female gender enhances the
23 203 multi functionality of the vegetable garden while the male gender is usually more focused on the
24 204 utilitarian perspective (in this case the horticultural production). Promiscuous management appears
25 205 to be a good way to integrate these two aptitudes, while making the best use of the agro-biodiversity
26 206 in their kitchens. The finding that men and women use different management techniques is
27 207 consistent with findings by Reyes-Garcia et al. (2010). However, our findings on the use of organic
28 208 fertilizers and pest controls are not in line with the mentioned research. In our study, women
29 209 appeared to use chemical products way more than men, and this is because of the age of our
30 210 respondents, their loneliness and their need to avoid heavy labours. In accordance with Carvalho
31 211 (2016), women are in charge for poultry and this explains the high number of animal breeders
32 212 among women. Fresh eggs are a source of proteins, which are not always easy to find in the alpine
33 213 areas. It is important to rethink Alps (and Alpine vegetable gardens), not as marginal areas fated to
34 214 die and to empty, but rather as reservoirs of biodiversity and cultural diversity (Salsa 2009),
35 215 especially when perpetuated by different gendered aptitudes.

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5 **217C Conclusions**
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7 218 Home gardens in the Alps are multifaceted productive and recreational spaces. In this study, we
8 219 analysed the influence of gender roles on agro-biodiversity and management of the alpine home
9 220 gardens in two Italian alpine valleys. Despite most of the literature emphasized the great role of
10 221 women in biodiversity conservation and traditional ecological knowledge keeping, this research
11 222 showed that the compresence of men and women appears to increase the level of biodiversity and
12 223 diversity in managements of alpine home gardens. Women showed to be more attentive to
13 224 aesthetics and more expert at foraging, while men are more focussed on the “productive” garden,
14 225 giving preference to horticultural species. Therefore, men and women use different species and
15 226 when gardening together they enhance biodiversity and diversity in managements. This results in a
16 227 mitigation of the differences between genders and in some cases, the exaltation of positive aspects
17 228 of one of them.
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Table 1 Percentage of taxa per gender group per plant category. A: tree and shrubs taxa; B: horticultural taxa; C: taxa of flower species cultivated for aesthetic purposes; D: wild and semi wild taxa; E: cereal and pseudocereal taxa. (F: Female only; M: Male only; MF: Male and Female)

CATEGORY	M (%)	MF (%)	F (%)
A	62,5	91,6	54,2
B	81,8	97,7	50
C	48,8	93,3	46,6
D	36,6	96,6	40
E	100	66,6	0

Table 2 List of mentioned taxa

CATEGORY	FAMILY	SPECIES
A (Tree and shrub species)	Aquifoliaceae	<i>Ilex aquifolium</i> L.
	Betalucaeae	<i>Corylus avellana</i> L.
	Caprifoliaceae	<i>Sambucus nigra</i> L.
	Ericaceae	<i>Vaccinium corymbosum</i> L.
	Fabaceae	<i>Acacia</i> spp.
	Fagaceae	<i>Castanea sativa</i> Mill.
	Grossulariaceae	<i>Ribes uva-crispa</i> L.; <i>Ribes nigrum</i> L.; <i>Ribes rubrum</i> L.
	Juglandaceae	<i>Juglans regia</i> L.
	Lauraceae	<i>Laurus nobilis</i> L.
	Primulaceae	<i>Prunus armeniaca</i> L.
	Rosaceae	<i>Malus domestica</i> Borkh.; <i>Prunus avium</i> L.; <i>Prunus cerasus</i> L.; <i>Prunus domestica</i> L.; <i>Prunus persica</i> L.; <i>Pyrus communis</i> L.; <i>Rubus fruticosus</i> L.; <i>Rubus idaeus</i> L. var. <i>fallgold</i> ; <i>Rubus idaeus</i> L.; <i>Rubus ulmifolius</i> Shott
Tiliaceae	<i>Tilia cordata</i> Mill.	
Vitaceae	<i>Vitis labrusca</i> L.	

B (Horticultural species)	Apiaceae	<i>Apium graveolens</i> L.; <i>Daucus carota</i> L.; <i>Foeniculum vulgare</i> Mill.; <i>Petroselinum crispum</i> L.
	Asteraceae	<i>Cichorium intybus</i> L.; <i>Lactuca</i> spp.; <i>Tanacetum balsamita</i> L.
	Brassicaceae	<i>Brassica cretica</i> Lam.; <i>Brassica oleracea</i> L. spp.; <i>Brassica oleracea</i> L. var. <i>botrytis</i> ; <i>Brassica oleracea</i> L. var. <i>gemmifera</i> ; <i>Brassica oleracea</i> L. var. <i>sabauda</i> ; <i>Brassica rapa</i> L.; <i>Raphanus sativus</i> L.
	Chenopodiaceae	<i>Spinacia oleracea</i> L.
	Cucurbitaceae	<i>Cucurbita pepo</i> L.; <i>Cucurbita</i> spp.
	Fabaceae	<i>Phaseolus vulgare</i> L.; <i>Pisum sativum</i> L.
	Lamiaceae	<i>Borago officinalis</i> L.; <i>Melissa officinalis</i> L.; <i>Mentha pratensis</i> L.; <i>Ocimum basilicum</i> L.; <i>Origanum majorana</i> L.; <i>Origanum vulgare</i> L.; <i>Rosmarinus officinalis</i> L.; <i>Salvia officinalis</i> L.; <i>Satureja montana</i> L.
	Liliaceae	<i>Allium ampeloprasum</i> L.; <i>Allium cepa</i> L.; <i>Allium sativum</i> L.; <i>Allium schoenoprasum</i> L.; <i>Asparagus acutifolius</i> L.
	Polygonaceae	<i>Rheum officinale</i> Baill.
	Rosaceae	<i>Fragaria vesca</i> L.
	Saxifragaceae	<i>Bergenia crassulaceae</i> L.
	Solanaceae	<i>Capsicum annuum</i> L.; <i>Lycopersicon esculentum</i> L.; <i>Solanum melongena</i> L., <i>Solanum tuberosum</i> L.
	C (Flowering species)	Amaryllidaceae
Araceae		<i>Zantedeschia aethiopica</i> (L.) Spreng.
Asteraceae		<i>Chrysanthemum</i> spp.; <i>Cyanus segetum</i> Hill.; <i>Dahlia</i> spp.; <i>Dimorphotheca pluvialis</i> (L.) Moench; <i>Gazania</i> spp.; <i>Tagetes</i> spp.
Balsaminaceae		<i>Impatiens balsamina</i> L.
Begoniaceae		<i>Begonia</i> spp.
Brassicaceae		<i>Alyssum montanum</i> L.; <i>Aubrieta deltoidea</i> (L.) DC.
Caryophyllaceae		<i>Dianthus</i> spp.
Clusiaceae		<i>Hypericum perforatum</i> L.
Geraniaceae	<i>Pelargonium graveolens</i> L.	
Hydrangeaceae	<i>Hydrangea</i> spp.	

	Iridaceae	<i>Crocus biflor</i> L.; <i>Gladiolus italicus</i> Mill.; <i>Iris</i> spp.
	Lamiaceae	<i>Lavandula stoechas</i> L.; <i>Salvia splendens</i> Sellow ex Schult.
	Leguminosae	<i>Wisteria sinensis</i> (Sims) Sweet
	Liliaceae	<i>Convallaria majalis</i> L.; <i>Fritillaria</i> spp.; <i>Hemerocallis fulva</i> (L.) L.; <i>Hyacinthus orientalis</i> L.; <i>Lilium</i> spp.; <i>Muscari comosum</i> L.; <i>Tulipa</i> spp.
	Malvaceae	<i>Alcea rosea</i> L.; <i>Hibiscus</i> spp.
	Oleaceae	<i>Forsythia suspense</i> (Thunb.) Vahl; <i>Syringa vulgaris</i> L.
	Onagraceae	<i>Fuchsia</i> spp.
	Parmeliaceae	<i>Cetraria islandica</i> L. Ach.
	Peoniaceae	<i>Paeonia</i> spp
	Ranunculaceae	<i>Anemone alpina</i> L.; <i>Aquilegia saximontana</i> Rydb.; <i>Clematis</i> spp.; <i>Delphinium inopinatum</i> Nevski; <i>Helleborus niger</i> L.
	Rosaceae	<i>Rosa</i> spp.
	Scrophulariaceae	<i>Antirrhinum majus</i> L.; <i>Digitalis</i> spp.
	Solanaceae	<i>Petunia</i> spp.
	Violaceae	<i>Viola tricolor</i> L.
D (Wild and semi-wild species)	Apiaceae	<i>Foeniculum vulgare</i> Mill.; <i>Levisticum officinale</i> W.D.J.Koch; <i>Pimpinella anisum</i> L.
	Apocinaceae	<i>Pervinca minor</i> L.
	Asteraceae	<i>Achillea erba-rotta</i> All.; <i>Achillea millefolium</i> L.; <i>Arnica montana</i> L.; <i>Artemisia absinthium</i> L.; <i>Calendula officinalis</i> L.; <i>Leontopodium alpinum</i> L.; <i>Tanacetum vulgare</i> L.; <i>Taraxacum officinale</i> Weber
	Cannabaceae	<i>Humulus lupulus</i> L.
	Caryophyllaceae	<i>Silene vulgaris</i> (Moench) Garcke
	Chenopodiaceae	<i>Beta vulgaris</i> L.; <i>Chenopodium bonus-henricus</i> L.
	Ericaceae	<i>Arctostaphylos uva-ursi</i> (L.) Spreng; <i>Rhododendron macrophyllum</i> L.; <i>Vaccinium myrtillus</i> L.

	Fabaceae	<i>Lupinus</i> spp.
	Gentianaceae	<i>Gentiana</i> spp
	Liliaceae	<i>Lilium martagon</i> L.
	Oxalidaceae	<i>Oxalis acetosella</i> L.
	Polygonaceae	<i>Polygonum bistorta</i> L.
	Primulaceae	<i>Primula vulgaris</i> L.
	Rosaceae	<i>Fragaria vesca</i> L.; <i>Rosa canina</i> L.
	Scrophulariaceae	<i>Veronica allionii</i> Vill.
	Urticaceae	<i>Urtica dioica</i> L.
	Violaceae	<i>Viola cornuta</i> L.
E	Poaceae	<i>Secale cereale</i> L.; <i>Zea mays</i> L. var. <i>pignoletto</i>
(Cereals and pseudo-cereals)	Polygonaceae	<i>Fagopyrum esculentum</i> L.

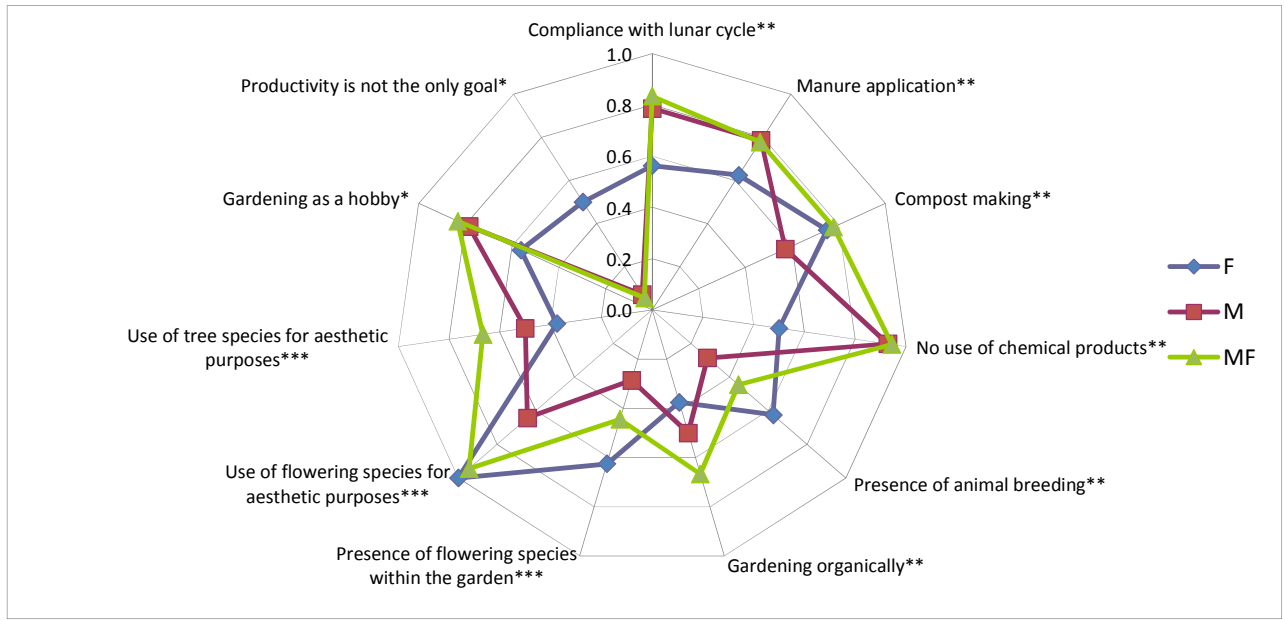


Figure 1 Amoeba graph of selected agricultural practices per gender. Every proportion expresses a higher or lower approval per gender and per variable (0= absence; 0,5= partial application; 1=presence). Therefore, higher values mean higher agreement on the variable. Values vary between 0 and 1. * = social factors; ** agroecological practices; ***cultural practices. (F: Female only; M: Male only; MF: Male and Female)



Fig 2 Number of taxa per category and gender group. A: tree and shrubs taxa; B: horticultural taxa; C: taxa of flowering species cultivated for aesthetic purposes; D: wild and semi wild taxa; E: cereal and pseudo-cereal taxa. (F: Female only; M: Male only; MF: Male and Female)

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7 **1 Alpine home gardens in the Western Italian Alps: role of gender on the local agro-biodiversity**
8 **2 and its management**

9
10 **3 Abstract**

11
12 4 Home gardens are reservoirs of biodiversity, promoting food security and maintaining farm
13 5 ecosystem processes. A study on alpine home gardens was conducted in two alpine valleys in
14 6 Piedmont, North-Western Italy. Forty semi-structured interviews with garden managers were
15 7 gathered. We analysed if gender roles affect the agro-biodiversity and the management of the alpine
16 8 home gardens in the Western Italian Alps. The results show that mixed couples (consisting of man
17 9 and woman) present higher diversity of managements and a higher number of taxa detected. ~~138~~
18 10 ~~taxa~~ were detected ~~138 taxa~~ among couples, 82 among male gardeners and 69 among female
19 11 gardeners. Indeed, when the vegetable garden is managed by men only, more than half of the taxa
20 12 are represented by horticultural species. On the other hand, when the vegetable garden is managed
21 13 by women only, flowering species, wild and semi-wild species represent a relevant percentage of
22 14 the total number of mentioned taxa. Despite most of the literature emphasized the great role of
23 15 women in biodiversity conservation and traditional ecological knowledge keeping, this study
24 16 showed that the compresence of men and women appears to increase the level of biodiversity and
25 17 diversity ~~in managements many variables of~~ alpine home gardens.

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26 18 **Keywords**

27 19 Marginal agriculture– Food security - Foraging– Tradition ecological knowledge - Cultural identity

28 20 **Introduction**

29 21 Home gardens can play a key role not only in biodiversity conservation but they also promote food
30 22 security and maintain farm ecosystem processes. Many studies have been carried out on home
31 23 gardens in tropical areas focusing on their biodiversity (Lamont et al.1999; Kehlenbeck and Maass
32 24 2004; Albuquerque et al. 2005; Sunwar et al. 2006; Kabir and Webb 2007; Galluzzi et al. 2010, Das
33 25 and Das 2015; Caballero-Serrano et al. 2016), on the role they play in food security (Montagnini
34 26 2006; Márquez and Schwartz 2008; Gray et al. 2013), the role they play in cultural identity, sense
35 27 of belonging (Bhatti and Church 2001; Perreault 2005; Bhatti 2006; Ghazali 2013), their resilience
36 28 (Wezel and Bender 2003; Aguilar-Støen et al. 2008; Van der Stege et al. 2012); ~~their socio-~~
37 29 ecological and cultural importance (Trinh et al. 2003; Buchmann 2009).

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38 30 Much less literature is available about home gardens in Europe. Calvet Mir (2011) led back this
39 31 phenomenon to the massive emigration from rural areas ~~that~~ occurred in the last ~~decadeys~~ and the

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consequent marginality of the European home gardens. Nevertheless, in the last fifteen years more scientific papers on European home gardens have been published especially in Iberian peninsula (Agelet, Bonet and Vallés 2000; Calvet-Mir et al. 2012; Reyes-García et al. 2010;2013;2014; Riu-Bosoms et al. 2014), in Austria (Vogl and Vogl-Lukasser 2003; Vogl-Lukasser et al. 2010), in Romania (Papp et al. 2012) in Hungary (Birol et al. 2005), and in Portugal (Carvalho 2016).

Few papers analysed home gardens from a gender perspective. As highlighted in Shiva (1995), both men and women of rural areas have deep traditional knowledge. However, men and women grow and deepen their knowledge on different species categories (Luoga et al. 2000; Trinh et al. 2003; Voeks 2007; Carvalho 2016, Ciftcioglu 2017). Indeed, home gardens are hotspots of agro-biocultural diversity (Saluzzi et al. 2010) and growing a home garden is not only producing tangible goods but ~~is~~ also a cultural space where traditional knowledge can be actively conserved (Linares and Eyzaguirre 2004). This knowledge is often kept by women, who are considered as biodiversity guardians (Howard 2003). Many studies explored how women play a more important role in preserving biodiversity when compared to men (Agrawal 2003; Vogl-Lukasser et al. 2010; Reyes-Garcia et al. 2010; Calvet-Mir et al. 2011). Specifically, Anderson (2003) explained that the value of the home ~~gardens~~² products is not only economic. Women play a major role also in neglected (and thus, not economically valued) species as wild and semi-wild plants which are crucial in maintaining biodiversity and food security (Howard 2003; Vogl-Lukasser et al. 2010). However, many researches emphasized that men and women are often both responsible for the management of the home garden, but they are involved in different tasks (Chambers and Momsen 2007; Reyes-Garcia et al. 2010).

In this study, we analysed if gender roles affect the agro-biodiversity and the management of the alpine home gardens in the Western Italian Alps.

Specifically, we aimed at:

- determine if gender influences agricultural practices in alpine home gardens;
- determine which group of *taxa* (A tree and shrubs; B horticultural species; C flower species cultivated for aesthetic purposes; D wild and semi wild; E cereal and pseudocereal) is used by which gender category (~~female only~~; ~~male only~~; male and female)
- intersect these data

Material and Methods

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Forty interviews were gathered in two alpine valleys in Piedmont, North Western Italy. Specifically, in the Po Valley (municipalities of Ostana and Oncino) and in the Pellice Valley (municipality of Rorà). Data were gathered during spring 2013 through semi-structured interviews with garden managers who fulfil the following requirements:

- own a vegetable garden above 900 m a.s.l. in the municipality of Rorà, Ostana, Oncino;
- have know-how on vegetable garden management;
- live at least one month per year in one of the municipalities listed above.

The Pellice valley and specifically Rorà is characterized by a population of 250 people and it is located at 1000 m a.s.l. Most of the inhabitants worked in the Po plain. Only a few of them worked in the municipality in agricultural activities. There is little tourism and it influences positively the landscape conservation (Mourglia 1901; Tourn 2002, 2003; Regione Piemonte 2003).

In the Po Valley, there is the source of Po river and there is one of the highest mountains in Europe, the Monviso. Oncino and Ostana, the two sites of the case study are located respectively on the orographic right and on the orographic left at an altitude of around 1200 m a.s.l. Ostana and Oncino have about 80 inhabitants each, but only a few of them (around 20 each) live permanently in the municipalities. The tortuous and long road to get to the plain does not allow daily transfers to work in denser populated areas. This means that the permanent residents are all retired and consequently the sample is characterized by elder people. The territory is also characterized by the transhumance during summer time in the mountain pasture (*meire*) above 1500 m a.s.l.

The methodological approach included quali-quantitative analysis through participatory observation. Qualitative data were gathered in a semi-structured interview, while data regarding plants of the gardens were collected through free listing method. Most of the interviews are conducted within the vegetable gardens, in a way to facilitate the plant enumeration. Some questions also regarded the management and were measured by the degree the gardeners do agree with the following statements: comply with the lunar cycle; use chemical products; apply manure; make compost; use flowering species for aesthetic purposes; the flowering species are planted within the garden; use of tree species for aesthetic purposes; garden as a hobby; productivity is not the only goal; farm organically; breed animals.

All *taxa* were recorded and were subdivided into five categories: A. tree and shrubs *taxa*; B. horticultural *taxa*; C. *taxa* of flowering species cultivated for aesthetic purposes; D. wild and semi-wild *taxa*; E. cereal and pseudocereal *taxa*. Moreover, ten questions were asked regarding the

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7 94 management, the reason for gardening, the know-how and the way they learnt it. Per each question,
8 95 a value between 0 and 1 is assigned. 0 means the interviewed does not agree or does not apply this
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10 96 method; 0,5 means the interviewed does partially agree or partially applies the method; 1 means the
11 97 interviewed does agree or applies the method.

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13 98 The sample consists of 40 vegetable gardens of which 8 are managed by women only (F), 14 are
14 99 managed by men only (M) and 18 are managed by couples, men and women (MF). In some cases,
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16 100 we found vegetable gardens managed by two men or two women; we classified them as F or M,
17 101 despite the number of people taking part in the management. The average age of the interviewed is
18 102 68 for the Po valley and 63 for the Pellice valley. More than 80% of the interviewed declare to be
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20 103 originally from the same valley.

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21 22 104 23 24 105 **Results**

25 106 The results (Fig 1) show a remarkable different management depending on gender. Agricultural
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27 107 practices were grouped into three main categories: agroecological practices (“agricultural practices
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29 108 aiming to produce significant amounts of food, which valorise in the best way ecological processes
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31 109 and ecosystem services in integrating them as fundamental elements in the development of the
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33 110 practices” Wezel et al. 2014, p.3); cultural practices (regarding sense of beauty and well-being);
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35 111 social factors (regarding the role the garden play in managers’ life)

36 37 38 112 **Management Agroecological practices**

39
40 113 The lunar cycle is taken into consideration mostly by men and couples. This is probably due to a
41 114 higher expectation on productivity. They believe that when planting or sowing vegetables who
42 115 grow down in the soil (like roots and tubers) the moon should be waning, while in the others
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44 116 vegetables who grow upward in the crescent moon.

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46 117 Manure application is considered as a heavy work. Nevertheless, more women use this method of
47 118 fertilization. In fact, women who breed chickens also apply their manure to the home garden, as a
48 119 way to use an output as an input. Gardeners also reported to get manure once a year by the cow
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50 120 shepherds (*marghè*) who graze the mountain pasture during summer time. Another mentioned
51 121 method consists of incorporating deer feces naturally deposited around the garden as manure.

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Compost making is a wide spread technique. It is mainly pursued by women because it is considered as part of the home realm. This explained why when home gardens are farmed by men only compost appears less used. Use of chemical products is very high when the farmer is a woman. This is due to the age of the interviewed (mostly above 60 years old) and the intensity of work required by the garden. Using chemicals is clearly a way to avoid heavy tasks. This is very evident; when the woman is not alone but in a couple, the use of chemicals is very low.

Animal breeding included chickens, cows, and goats. Poultry is mainly women domain, they are sometimes fed with kitchen waste and they do not require any masculine labour. Cows and goats are mainly kept some by transhumant shepherds and some local farmers. Organic gardens are not wide spread. This is because in these valleys there is still a traditional farming, a way of cultivating “as my grandparents used to do”. There are few home gardeners who have knowledge on the distinction between organic and conventional agriculture.

Management Cultural practices

Aesthetics is also an important issue, the totality of the women affirmed to use flowering species for improving the sense of beauty, most of women also declared to incorporate them into the home garden. When gardeners are men only there are less flowers in general and much less within the garden which is supposed to be more productive and less aesthetic. The datum regarding the use of tree species for aesthetic purposes shows how men and women gardeners can improve their home garden when farming together. Trees are appreciated by men for their productivity and by women for the shade and their intrinsic beauty.

Management Social factors

Gardening is generally considered as a hobby by men, definitely not for women. To women, it means fresh good food at the doorstep, for men is mainly a way to spend their time efficiently and productively. For this reason, when couples work together in their home gardens they do consider gardening as a hobby, but it is at the same time productive and recreational.

Species and Gender

Figure 2 shows that mixed couples (MF) present a higher level of records per plant group (except for category E). Moreover, women (F) appear to have a deeper knowledge of wild and semi-wild species when compared with men (M). Regarding cereals and pseudocereals (category E) men appear to be the main responsible for this cultivation. It can also be observed that women are less prone to cultivate vegetables. Considering the others categories (A,C,D), men and women show

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7 153 similar values. MF group has the highest number of taxa per each category (except for E) and this is
8 154 probably due to the complementarity of the M and F groups skills.
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10 155 Table 1 shows that MF group has a higher level of diversification of records if compared with F and
11 156 M, showing a higher level of biodiversity by complementing knowledge from both genders. This is
12 157 true for categories A, B, C and D, while for E, M group has the highest level of diversification.
14 158 Results above show that the mixed group is able to reduce the differences between the gardens
15 159 managed by men and women. When the vegetable garden is managed by men the percentage of
17 160 horticultural species (B) is more than 50%. The percentage decreases when the management is
18 161 promiscuous and even more, when only women cultivate it. The opposite occurs when flowering
19 162 species (C) are considered. When the vegetable garden is managed by women only the percentage
21 163 of flower species (C) is very high, when the management is promiscuous it slightly decreases and it
22 164 is even lower when the garden is cultivated by men only.

24 165 Among couples (MF) were detected 138 *taxa*, while 82 among male (M) gardeners (30% less) and
25 166 69 among female (F), gardeners (50% less). List of mentioned *taxa* is reported in table 2.
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29 168 **Discussion**

31 169 A large part of the literature showed that women increase the biodiversity (Hoogerbrugge and
32 170 Fresco 1993; Agrawal 2003; Vazzana et al. 2010; Calvet-Mir et al. 2011) and enrich the vegetable
34 171 garden with flower species (Reyes-Garcia et al. 2010), wild and semi-wild species (Vogl-Lukasser
35 172 et al. 2010). In this study, we observed that when the alpine home garden is managed by a couple
37 173 (man and woman) the number of landraces is significantly higher (=138 *taxa*) than in the other two
38 174 cases (F= 74 *taxa*; M= 88 *taxa*). This can be observed in 4 out of 5 plant categories we created (in
39 175 A: tree and shrubs *taxa*; B: horticultural *taxa*; C: *taxa* of flower species cultivated for aesthetic
41 176 purposes; D: wild and semi-wild *taxa*; but not in E: cereal and pseudocereal *taxa*). Indeed, men are
42 177 generally more interested in the species who have market value, while women mainly aim at their
44 178 culinary and nutritional value (Balakrishnan 1999). This can be observed in the horticultural
45 179 category (B) who have a higher market value and shows higher number of *taxa* for men. It is in line
46 180 with some recent studies by Ciftcioglu (2017), who reported that male respondents valued the
48 181 opportunity to grow horticultural species (B) more than the women, while female respondents
49 182 tended to value more ornamental plants (C). Also, women are greater foragers of products from
50 183 common-pool resources (Agrawal 2003). Indeed, women are often responsible for foraging and
52 184 gathering (Howard-Borjas and Cuijpers 2002), especially if wild and semi wild plants are close to
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7 185 houses and home-gardens. On the other hand, the gathering of wild species that grow at very high
8 186 altitude or in places hard to get, like *Artemisia absinthium*, it is a man's prerogative (Ertug 2003).
9
10 187 The wild species have been essential during the famine in each Occitan valley of Italian Alps and
11 188 the persistence of traditional knowledge regarding these species is the proof of their basic role in the
12 189 food security (Mattalia et al. 2012). Having good traditional knowledge on wild and semi-wild
13
14 190 species, also means transferring non-cultivated biodiversity from the field to the plate. This is not
15 191 only an important task in the domestic realm, but also an active way to preserve biodiversity and its
16 192 traditional knowledge. Furthermore, the Alpine home garden could preserve safeguarded species
17
18 193 (particularly for semi-wild species). For instance, some managers reported the presence within their
19 194 home gardens of *Lilium martagon*, *Lilium croceum* and some Gentianaceae which are totally
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21 195 safeguarded species (Regione Piemonte 2009). The responsible for this contamination is mainly
22 196 woman who, not only insert the wild in the domesticated, but they create the habitat to allow rare
23 197 not-welcomed plant to grow (Vogl-Lukasser et al. 2010).
24
25 198 Another important aspect regards the aesthetics within the garden. Recreating a sense of beauty, a
26
27 199 sense of belonging, a sense of place is generally considered a women task. By decorating the house
28 200 and the adjacent external areas, the woman incorporates ornamental biodiversity. Men did not value
29 201 the use of ornamental ("useless") plants (Carvalho 2016). Cultivating primly the home garden,
30
31 202 women create surplus value to the functionality of the horticultural species planted by men. Gardens
32 203 become a reason for pride and satisfaction (Heckler 2004), exchange, perpetration of the cultural
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34 204 identity and expression of its own subjectivity (Murrieta and WinklerPrins 2009). Moreover,
35 205 women take care of the nutritional point of view (in addition to the medical one) since they know
36 206 the properties of the plant (Daniggelis 2003). As in the results, the female gender enhances the
37
38 207 multi functionality of the vegetable garden while the male gender is usually more focused on the
39 208 utilitarian perspective (in this case the horticultural production). Promiscuous management appears
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41 209 to be a good way to integrate these two aptitudes, while making the best use of the agro-biodiversity
42 210 in their kitchens. The finding that men and women use different management techniques is
43 211 consistent with findings by Reyes-Garcia et al. (2010). However, our findings on the use of organic
44
45 212 fertilizers and pest controls are not in line with the mentioned research. In our study, women
46 213 appeared to use chemical ~~products way more than~~ men, and this is because of the age of our
47 214 respondents, their loneliness and their need to avoid heavy labours. In accordance with Carvalho
48
49 215 (2016), women are in charge for poultry and this explains the high number of animal breeders
50 216 among women. Fresh eggs are a source of proteins, which are not always easy to find in the alpine
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52 217 areas. It is important to rethink Alps (and Alpine vegetable gardens), not as marginal areas fated to

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die and to get empty, but rather as reservoirs of biodiversity and cultural diversity (Salsa 2009), especially when perpetuated by different gendered aptitudes.

Conclusions

Home gardens in the Alps are multifaceted productive and recreational spaces. In this study, we analysed the influence of gender roles on agro-biodiversity and management of the alpine home gardens in two Italian alpine valleys. Despite most of the literature emphasized the great role of women in biodiversity conservation and traditional ecological knowledge keeping, this research showed that the compresence of men and women appears to increase the level of biodiversity and diversity in managements of alpine home gardens. Women showed to be more attentive to aesthetics and more expert at foraging, while men are more focussed on the “productive” garden, giving preference to horticultural species. Therefore, men and women use different species and when gardening together they enhance biodiversity and diversity in managements. This results in a mitigation of the differences between genders and in some cases, the exaltation of positive aspects of one of them.

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Table 1 Percentage of taxa per gender group per plant category. A: tree and shrubs taxa; B: horticultural taxa; C: taxa of flower species cultivated for aesthetic purposes; D: wild and semi wild taxa; E: cereal and pseudocereal taxa. (F: Female only; M: Male only; MF: Male and Female)

CATEGORY	M (%)	MF (%)	F (%)
A	62,5	91,6	54,2
B	81,8	97,7	50
C	48,8	93,3	46,6
D	36,6	96,6	40
E	100	66,6	0

Table 2 List of mentioned taxa

CATEGORY	FAMILY	SPECIES
A (Tree and shrub species)	Aquifoliaceae	<i>Ilex aquifolium</i> L.
	Betalucaeae	<i>Corylus avellana</i> L.
	Caprifoliaceae	<i>Sambucus nigra</i> L.
	Ericaceae	<i>Vaccinium corymbosum</i> L.
	Fabaceae	<i>Acacia</i> spp.
	Fagaceae	<i>Castanea sativa</i> Mill.
	Grossulariaceae	<i>Ribes uva-crispa</i> L.; <i>Ribes nigrum</i> L.; <i>Ribes rubrum</i> L.
	Juglandaceae	<i>Juglans regia</i> L.
	Lauraceae	<i>Laurus nobilis</i> L.
	Primulaceae	<i>Prunus armeniaca</i> L.
	Rosaceae	<i>Malus domestica</i> Borkh.; <i>Prunus avium</i> L.; <i>Prunus cerasus</i> L.; <i>Prunus domestica</i> L.; <i>Prunus persica</i> L.; <i>Pyrus communis</i> L.; <i>Rubus fruticosus</i> L.; <i>Rubus idaeus</i> L. var. <i>fallgold</i> ; <i>Rubus idaeus</i> L.; <i>Rubus ulmifolius</i> Shott
Tiliaceae	<i>Tilia cordata</i> Mill.	
Vitaceae	<i>Vitis labrusca</i> L.	

B (Horticultural species)	Apiaceae	<i>Apium graveolens</i> L.; <i>Daucus carota</i> L.; <i>Foeniculum vulgare</i> Mill.; <i>Petroselinum crispum</i> L.
	Asteraceae	<i>Cichorium intybus</i> L.; <i>Lactuca</i> spp.; <i>Tanacetum balsamita</i> L.
	Brassicaceae	<i>Brassica cretica</i> Lam.; <i>Brassica oleracea</i> L. spp.; <i>Brassica oleracea</i> L. var. <i>botrytis</i> ; <i>Brassica oleracea</i> L. var. <i>gemmifera</i> ; <i>Brassica oleracea</i> L. var. <i>sabauda</i> ; <i>Brassica rapa</i> L.; <i>Raphanus sativus</i> L.
	Chenopodiaceae	<i>Spinacia oleracea</i> L.
	Cucurbitaceae	<i>Cucurbita pepo</i> L.; <i>Cucurbita</i> spp.
	Fabaceae	<i>Phaseolus vulgare</i> L.; <i>Pisum sativum</i> L.
	Lamiaceae	<i>Borago officinalis</i> L.; <i>Melissa officinalis</i> L.; <i>Mentha pratensis</i> L.; <i>Ocimum basilicum</i> L.; <i>Origanum majorana</i> L.; <i>Origanum vulgare</i> L.; <i>Rosmarinus officinalis</i> L.; <i>Salvia officinalis</i> L.; <i>Satureja montana</i> L.
	Liliaceae	<i>Allium ampeloprasum</i> L.; <i>Allium cepa</i> L.; <i>Allium sativum</i> L.; <i>Allium schoenoprasum</i> L.; <i>Asparagus acutifolius</i> L.
	Polygonaceae	<i>Rheum officinale</i> Baill.
	Rosaceae	<i>Fragaria vesca</i> L.
	Saxifragaceae	<i>Bergenia crassulaceae</i> L.
	Solanaceae	<i>Capsicum annuum</i> L.; <i>Lycopersicon esculentum</i> L.; <i>Solanum melongena</i> L., <i>Solanum tuberosum</i> L.
	C (Flowering species)	Amaryllidaceae
Araceae		<i>Zantedeschia aethiopica</i> (L.) Spreng.
Asteraceae		<i>Chrysanthemum</i> spp.; <i>Cyanus segetum</i> Hill.; <i>Dahlia</i> spp.; <i>Dimorphotheca pluvialis</i> (L.) Moench; <i>Gazania</i> spp.; <i>Tagetes</i> spp.
Balsaminaceae		<i>Impatiens balsamina</i> L.
Begoniaceae		<i>Begonia</i> spp.
Brassicaceae		<i>Alyssum montanum</i> L.; <i>Aubrieta deltoidea</i> (L.) DC.
Caryophyllaceae		<i>Dianthus</i> spp.
Clusiaceae		<i>Hypericum perforatum</i> L.
Geraniaceae	<i>Pelargonium graveolens</i> L.	
Hydrangeaceae	<i>Hydrangea</i> spp.	

	Iridaceae	<i>Crocus bicolor</i> L.; <i>Gladiolus italicus</i> Mill.; <i>Iris</i> spp.
	Lamiaceae	<i>Lavandula stoechas</i> L.; <i>Salvia splendens</i> Sellow ex Schult.
	Leguminosae	<i>Wisteria sinensis</i> (Sims) Sweet
	Liliaceae	<i>Convallaria majalis</i> L.; <i>Fritillaria</i> spp.; <i>Hemerocallis fulva</i> (L.) L.; <i>Hyacinthus orientalis</i> L.; <i>Lilium</i> spp.; <i>Muscari comosum</i> L.; <i>Tulipa</i> spp.
	Malvaceae	<i>Alcea rosea</i> L.; <i>Hibiscus</i> spp.
	Oleaceae	<i>Forsythia suspensa</i> , <i>Forsythia suspense</i> (Thunb.) Vahl; <i>Syringa vulgaris</i> L.
	Onagraceae	<i>Fuchsia</i> spp.
	Parmeliaceae	<i>Cetraria islandica</i> L. Ach.
	Peoniaceae	<i>Paeonia</i> spp
	Ranunculaceae	<i>Anemone alpina</i> L.; <i>Aquilegia saximontana</i> Rydb.; <i>Clematis</i> spp.; <i>Delphinium inopinum</i> Nevski; <i>Helleborus niger</i> L.
	Rosaceae	<i>Rosa</i> spp.
	Scrophulariaceae	<i>Antirrhinum majus</i> L.; <i>Digitalis</i> spp.
	Solanaceae	<i>Petunia</i> spp.
	Violaceae	<i>Viola tricolor</i> L.
D (Wild and semi-wild species)	Apiaceae	<i>Foeniculum vulgare</i> Mill.; <i>Levisticum officinale</i> W.D.J.Koch; <i>Pimpinella anisum</i> L.
	Apocynaceae	<i>Pervinca minor</i> L.
	Asteraceae	<i>Achillea erba-rotta</i> All.; <i>Achillea millefolium</i> L.; <i>Arnica montana</i> L.; <i>Artemisia absinthium</i> L.; <i>Calendula officinalis</i> L.; <i>Leontopodium alpinum</i> L.; <i>Tanacetum vulgare</i> L.; <i>Taraxacum officinale</i> Weber
	Cannabaceae	<i>Humulus lupulus</i> L.
	Caryophyllaceae	<i>Silene vulgaris</i> (Moench) Garcke
	Chenopodiaceae	<i>Beta vulgaris</i> L.; <i>Chenopodium bonus-henricus</i> L.
	Ericaceae	<i>Arctostaphylos uva-ursi</i> (L.) Spreng; <i>Rhododendron macrophyllum</i> L.;

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		<i>Vaccinium myrtillus</i> L.
	Fabaceae	<i>Lupinus</i> spp.
	Gentianaceae	<i>Gentiana</i> spp.
	Liliaceae	<i>Lilium martagon</i> L.
	Oxalidaceae	<i>Oxalis acetosella</i> L.
	Polygonaceae	<i>Polygonum bistorta</i> L.
	Primulaceae	<i>Primula vulgaris</i> L.
	Rosaceae	<i>Fragaria vesca</i> L.; <i>Rosa canina</i> L.
	Scrophulariaceae	<i>Veronica allionii</i> Vill.
	Urticaceae	<i>Urtica dioica</i> L.
	Violaceae	<i>Viola cornuta</i> L.
E	Poaceae	<i>Secale cereale</i> L.; <i>Zea mays</i> L. var. <i>pignoletto</i>
(Cereals and pseudo-cereals)	Polygonaceae	<i>Fagopyrum esculentum</i> L.

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