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**BOOK OF ABSTRACTS**

**Agroforestry for the transition towards  
sustainability and bioeconomy**



## FOOD FOR FOREST – Restorative Silvi-Pastoralism: the Food that Feeds the Forest

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Agroforestry for the transition towards  
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Abstract

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### Abstract

Silvi-pastoralism is a well-known practice for the exploitation of managed ecosystems encompassing woodlands, shrublands, and grasslands (see for instance Mosquera-Losada et al., 2009). Particularly, it can be proficiently used for an effective restoration of marginal and degraded pastures and forests, by enhancing the related ecosystem services (i.e. forage and wood provision, biodiversity, carbon storage, erosion control, fire hazard reduction, and landscape and recreation) while maintaining or improving the economic returns for farmers (Torralba et al. 2016; Moreno et al. 2018). Among livestock species farmed in silvi-pastoral systems, pigs are widely spread in many Mediterranean regions of Europe (Caballero et al. 2011). Indeed, their grazing behaviour is particularly suitable for an optimal exploitation of the understory of Mediterranean and temperate forests, where they can feed on tree (especially Fagaceae) fruits, green leaves of coarse plants (like wild-bramble), plant underground organs, etc. (Ferraz de Oliveira et al. 2013). 'Food For Forest' is a pilot project founded by the Rural Development Program (operation 16.2) of Piedmont Region (NW Italy) aiming to evaluate the effectiveness of semi-free range grazing pigs in forestlands as a pastoral and silvicultural tool for the restoration and valorisation of degraded temperate forests. This general aim includes different specific objectives. First, the mitigation of the effects of land fragmentation through the creation of land consolidation associations (according to the regional law in force, L.R. 21/2016), and the involvement of local public and private landowners. Second, the restoration of some degraded woodlands, through coarse plants and wild-bramble control using grazing pigs, thus encouraging the return to an active silviculture. Third, the enhancement of forest biodiversity, which benefits of an improved fertility due to livestock dung and urine deposition, and the reduction of alien and invasive species due to pig feeding selection. Last, the growth and fattening of pigs through a low-cost feeding resource.

The study has been established in two semi-abandoned hill stands, for a total of 18.5 ha, characterised by a poor provision of their ordinary ecosystem services. Two land consolidation associations were created, as to ensure continuity after the project. In each of them, 20 barrows (Nero di Parma) exploited the stands with rotational grazing system from April to December. From the beginning of the project, in 2017, the following activities have been carried out: i) evaluation of feeding selection of grazing pigs on herbaceous, shrub, and woody vegetation; ii) monitoring of swine health and performances; iii) involvement of public

and private owners in land consolidation associations; iv) evaluation of economic sustainability of the pilot project; and v) creation of local supply chains for swine and woody derived products.

Pig feeding selection was assessed during 12 surveying dates through direct observations. For each monitored pig, a complete list of both available and grazed plant species was recorded at three-minutes intervals. A total of 840 surveys was carried out and the 33 most common plants were classified as either preferred, indifferently consumed or avoided species, according to Manly et al. (2002) preference index. The analysis revealed four preferred (namely, *Corylus avellana*, *Hedera helix*, *Robinia pseudoacacia*, and *Rubus* spp.), 13 indifferently consumed (*Acer campestre*, *A. pseudoplatanus*, *Castanea sativa*, *Clematis vitalba*, *Cornus sanguinea*, *Fraxinus excelsior*, *Humulus lupulus*, *Molinia arundinacea*, *Parietaria officinalis*, *Prunus avium*, *Sambucus nigra*, *Tamus communis*, and *Ulmus minor*), and 16 avoided (*Asphodelus albus*, *Carex sylvatica*, *Crataegus monogyna*, *Euonymus europaeus*, *F. ornus*, *Ligustrum vulgare*, *Lonicera caprifolium*, *Physospermum cornubiense*, *Quercus ceris*, *Q. pubescens*, *Q. robur*, *Ruscus aculeatus*, *Solidago gigantea*, *Viburnum lantana*, *Vinca minor*, and *Viola riviniana*) species.

A silvicultural renovation cut was carried out, removing 64.4 m<sup>2</sup> ha<sup>-1</sup> (35.9% on the total available stock). The effects of feeding selection on post-cut tree resprouting were monitored on 99 stumps mainly belonging to the following species: *C. sativa*, *C. avellana*, *F. ornus*, *P. avium*, and *R. pseudoacacia*. A total of 1045 sprouts were monitored through time (seven recording dates) to assess the effect of swine feeding on plant health (signs of grazing on buds and leaves) and growth (height measurements). The evidence of the grazing pressure increased through time. In early spring, 10% of sprouts showed grazing signs, while in late summer 45% of sprouts were damaged. Initially, grazing affected selectively the buds, in particular of *C. sativa* and *C. avellana*, while later pigs fed on both buds and leaves. *F. ornus* and *R. pseudoacacia* were less affected than other species and at the end of survey only 4% and 20% of the shoots of these two species displayed grazing signs, respectively. Sprout height growth was remarkably conditioned by grazing since the average stump height of most species remained unvaried from May to August and below 20 cm. A progressive growth through time was observed only in *F. ornus* (average height of 54 cm in late summer) and *R. pseudoacacia* (average height of 188 cm in late summer) resprouts, highlighting a reduced grazing pressure on the stumps of these two species in comparison to the others.

During the grazing period (240 days) the pigs grew from 60 to 157 kg weight (10 to 18 months age), on average. The swine growing performances was compared with similar management systems and a difference ranging between -60% and -25% (beginning and ending of the grazing period, respectively) in weight increase was observed. This variability of the live weight gains was likely related to the adaptation needing and the different seasonal fodder availability, since pigs received a limited feed supplementation (approximately 2 kg pig<sup>-1</sup> day<sup>-1</sup>), unvaried during the whole grazing period. Nevertheless, the economic sustainability for farmers of this multifunctional grazing regime is expected due to the reduced use of feed supplements and the higher value of sold meat, even though a thorough evaluation is still in progress.

These first promising results highlight the possibility to replicate the silvi-pastoral management approach proposed by 'Food For Forest' in similar environmental and administrative conditions, while considering the benefits attainable by local stakeholders from grazing pigs.

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