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Grazed orchards in France: different forms of livestock integration and their implications for fruit growers' practices

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Agroforestry for the transition towards
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Abstract

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Theme: Managing Mediterranean agro-silvopastoral systems

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Abstract

Combining animals and crops in different forms of silvopastures has long been a traditional practice in Europe (Burgess et al. 2017). Today, in a context of moving agriculture towards more sustainable production systems, some fruit growers have chosen to re-introduce animals, in particular sheep into their orchard. They are mainly motivated by the intention to manage weeds in a different way and to improve pest and disease regulation (Mayr et al. 2007), while at the same time saving on phytosanitary treatments and fertilizers.

We carried out semi-structured interviews with 20 farmers in several regions of France (Provence and North-West). These interviews aimed to analyse: (i) farms structure (different productions and their respective area); (ii) the motivations of the farmers to integrate livestock and fruit trees; (iii) the technical adaptations that sylvopastoralism generated; and finally (iv) the services and disservices provided by animals in orchards.

The place of the animal in orchards is highly dependent on the fruit grower's expectations with regard to the provided services, his interest in livestock farming, but it is also closely linked to his ability to make his production system evolve and acquire new skills. We identified three possible organizations depending on the fruit grower degree of involvement into livestock farming:

- (i) **Type 1: Farmers cooperation (n=10).** A fruit grower may use a flock from another livestock farmer. Thus, shepherds graze their large livestock from the end of the fruit harvest until budburst the following spring on dense orchard areas. This mainly informal arrangement benefits both parties: access to a grass resource for the herd and weed management for the orchard, thus eliminating at least one mechanical or chemical weeding.
- (ii) **Type 2: Orchard-Livestock punctual integration (n=6).** When a producer aims to optimize the prophylactic action of the sheep against specific pests and diseases such as vole (*Microtus duodecimcostatus*), codling moth (*Cydia pomonella*), scab (*Venturia inaequalis*), he acquires a herd, often of limited size. The herd then grazes as quickly as possible after harvest in order to consume fruits leftovers and leaves, potential sources of inoculum. It then leaves the orchards as budbreak begins. In this configuration, the fruit grower has "fallback" plots: grasslands, mountain pastures or wooded plots, for grazing his herd during spring and summer.
- (iii) **Type 3: Orchard-Livestock quasi-permanent integration (n=4).** Some fruit growers have opted to maximize the presence of their herd in orchards. A quasi-permanent pasture except during harvest and lambing periods provides more room for manoeuvre to increase the impact of sheep on the main pests and diseases in the orchard. In particular, by adjusting the frequency and the duration of sheep presence on a given plot.

Changes in the orchard and the fruit grower profession

Besides the collaboration with a professional shepherd, when a fruit farmer owns his herd, investments (fences, shelters, veterinary care...) and orchard improvements have to be considered, although they are partially compensated by livestock sales. In quasi-permanent integration (type 3), it may be necessary to raise the fruiting area to at least 1.10 m above ground, raising tree height.

Moreover, the presence of herds becomes an additional factor to be considered in relation to the nature of the normal management: pruning, treatments, harvesting. Because of copper toxicity towards sheep, it is essential to use an alternative to this active ingredient or to exclude the animals from the plot for 20 to 30 days after copper application. A large part of the extra work related to sheep farming is the management of fodder resource, by organising rotational grazing systems between tree rows, using mobile fences in order to move sheep regularly. Observing sheep's behaviour is also a crucial activity to detect any situation of insufficient grass resources, in order to prevent the risk of damaging tree bark.

Finally, sheep farming also involves more on-call duty, especially during the lambing period. New regulatory and sanitary constraints must be respected. It is also necessary to open up to new professional networks (veterinarians, shearers, slaughterhouses, etc.).

A flexible system for more sustainability

The main advantage of the livestock-orchard mixed system is its flexibility as it is compatible with all production methods (conventional, organic, biodynamic) and paves the way to numerous combinations between orchard and livestock (De Lacroix et al. 2011) depending on the objectives and socio-economic contexts of fruit growers (e.g. geese in peach orchards, hens in olive grove, pigs in apple orchards...). The example of sheep and apple orchard integration described here shows that there are many ways in which animals can be integrated, and that this degree of integration has a significant impact on farmers' management practices.

Moreover, through the reduction of the use of inputs, it has a positive environmental impact, contributing to practice changes and a shift of societal vision of fruit growers. Getting beyond the single model of the specialized and intensified orchard is not simple but can be done gradually. New orchard models will have to be designed, site-specific or 'tailor-made' in accordance with the objectives, needs, skills and constraints of each fruit grower.



Figure 1. Example of cherry orchard in Provence region corresponding to our Type 2 (credits: Compagnone M.).

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