Research and farming experience in agroforestry: from theory to practice

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Olive Agroforestry

In EU > 4 million ha of olives are becoming unprofitable

(high costs, low price, decoupling of subsidies)

Risk of abandonment

Integrating crops and livestok may be one agroecological solution

More yield
More income
More sustainable

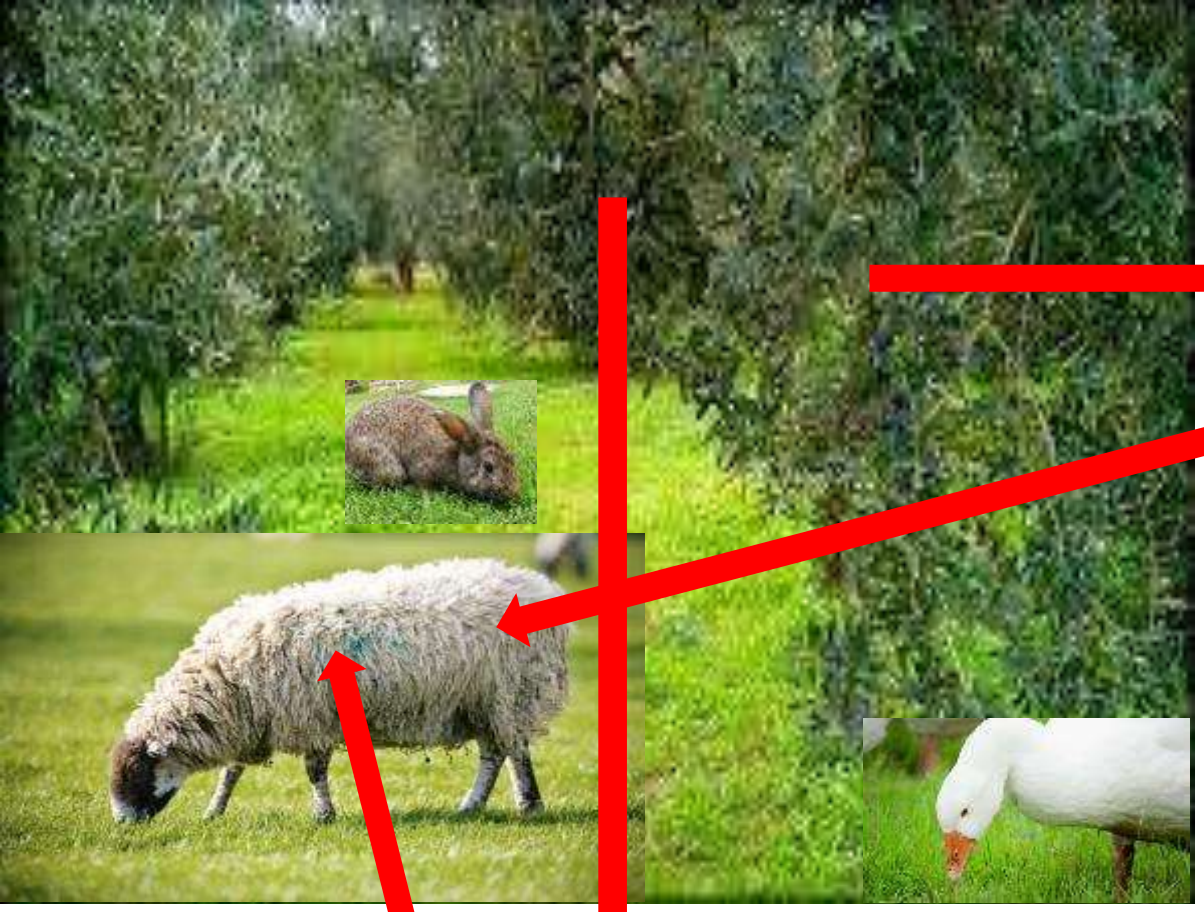
Olive trees used to be grown in polycultures

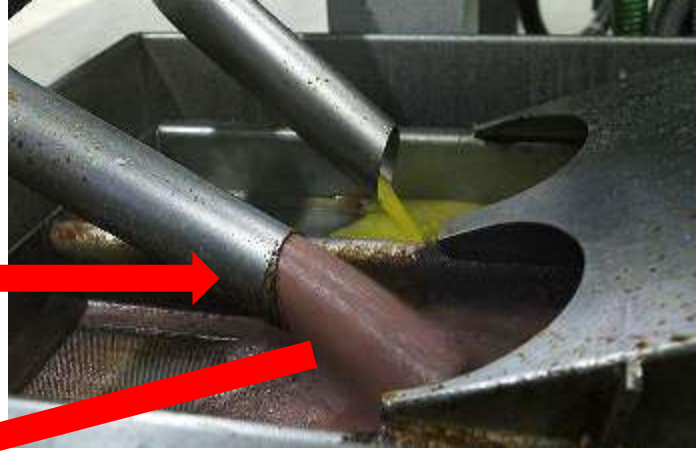
In the last century most olive growing became specialized (monocrop)

Creating problems with erosion, fertility, loss of biodiversity…

To overcome problems, green mulching is increasingly adopted

Why then not use a profitable/marketable green mulch?





Olive orchards produce 3 main sources of forage:

1) Grass
2) De-pitted cake
3) Pruning biomass


Trees can also provide:
Shelter and shade
Protection against predators
Additional feed (fallen fruits)

Livestock need shade

(exp. with climate change)

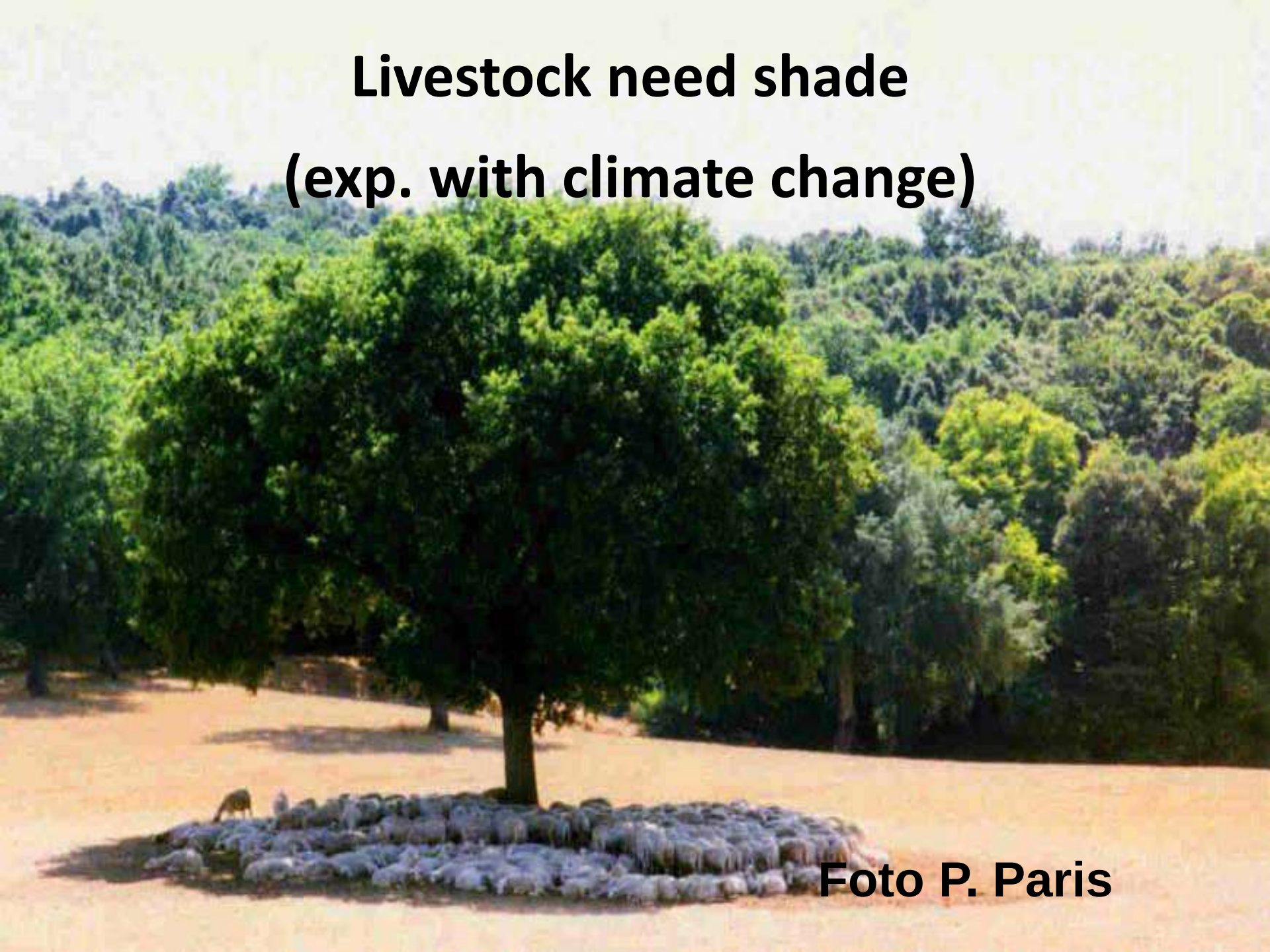


Foto P. Paris

Photo by João Palma


In turn, animals can provide:
Weeding
Fertilizing
Pest control

Animals work:

For free

24/24; 7/7, 365/365

No unions, holidays etc..

They are happy to do it!!!

In fact, they much prefer to “work” than not be allowed to!

the
olive
chicken
wild asparagus
case

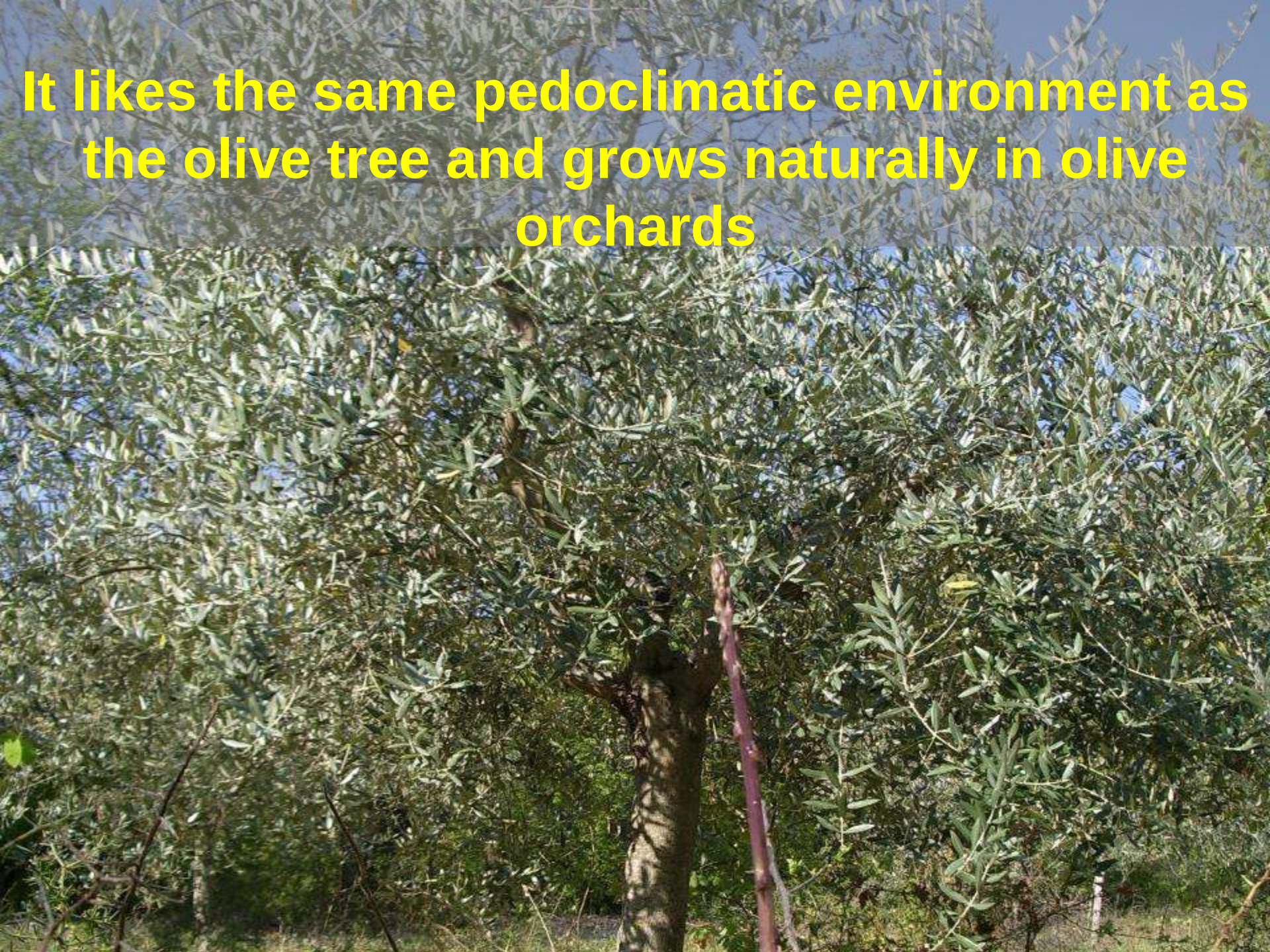
Why grow wild asparagus (*Asparagus acutifolius*) under olives?

Additional crop, additional income

New crop, but existing market

Interesting price (10-30 €/kg)

Grows naturally under olive trees

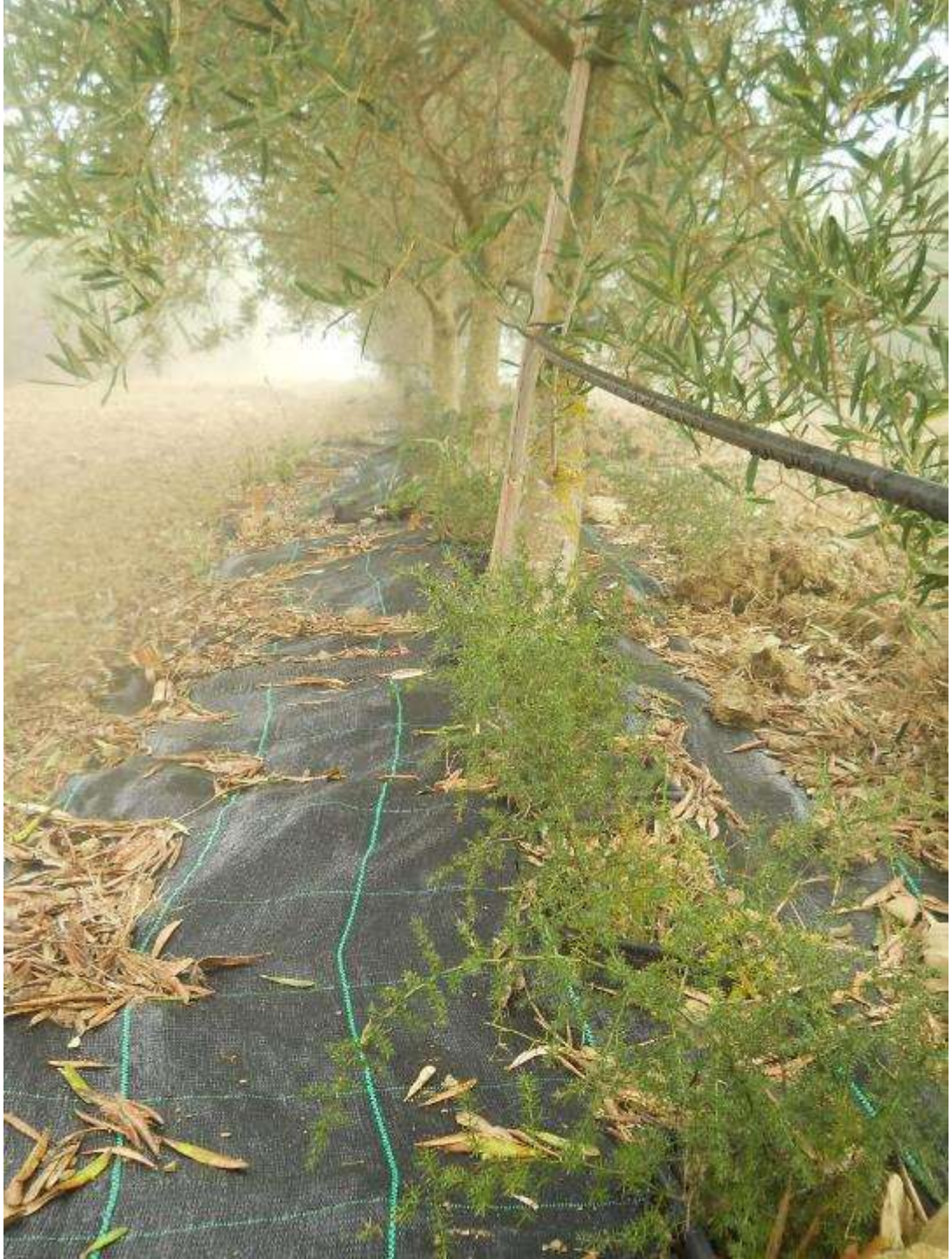

It likes the same pedoclimatic environment as the olive tree and grows naturally in olive orchards


In olive orchards, maximum oil yield @ 55% light interception (Villalobos et al. 2006).
45% light available for understory crops


In young orchards there is plenty more light


Wild asparagus in traditional orchard…


… and in super high density (i.e. hedgerow) orchard…



Results

Olive yield not affected by asparagus

Asparagus yield 30% lower than full sun

Spear quality increased
(more tender in shade)

Asparagus yield = 60-70%

70
60
50
40
30
20
10
0

Uniform light = 45% of incident

Asparagus yield = 45-85%

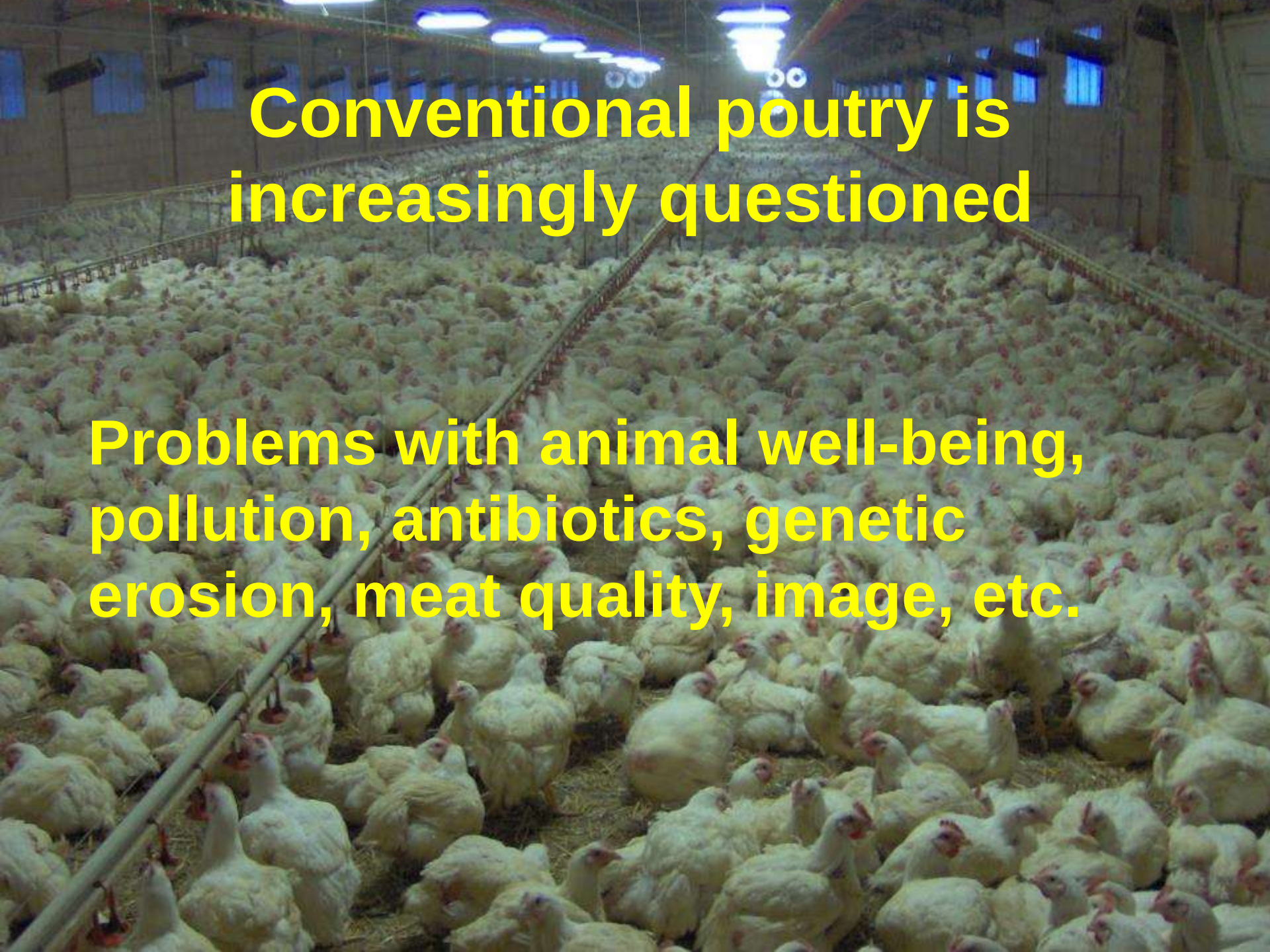
70
60
50
40
30
20
10
0

Non-uniform light


But weeding is more
demanding with asparagus


We asked chickens to help


Free range chickens are increasingly preferred over conventional, indoor chickens



Conventional poutry is increasingly questioned

Problems with animal well-being, pollution, antibiotics, genetic erosion, meat quality, image, etc.


Is free range sustainable?
•Lower feed conversion efficiency
•Greater land use


There is no reason why chickens should graze on land dedicated only to them!
Chickens can graze orchards!
Many advantages


2-3 cycles/year
1000 chickens/ha


Chicken semi-movable housing


Effective weeding

Effective Fertilization

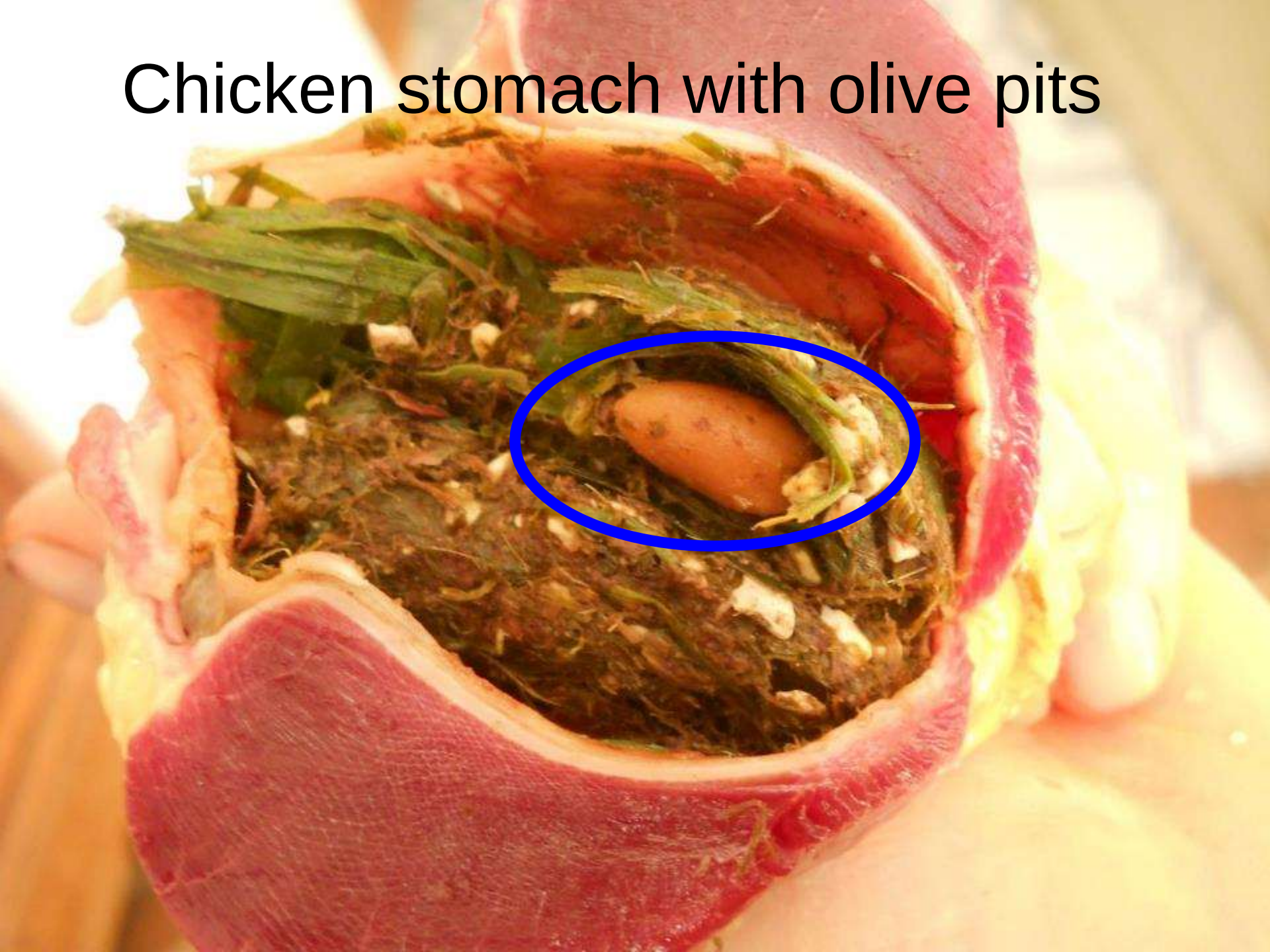
180 kg/ha N

220 kg/ha P_2O_5

More than enough for olives and asparagus

Pecunia non olet

Chicken stomach with olive pits



Lots of pits!!!


And grass!!!

Chickens can destroy suckers

Need appropriate fencing

Some published work

Polli al pascolo nell'oliveto Risparmio a tutto campo

Si evitano il diserbo e la concimazione, con vantaggi economici e ambientali: niente inquinamento diretto nè consumo di carburanti e mezzi. L'attività motoria degli animali consente di ottenere carni più magre, ricche in ferro e di maggiore consistenza

DI A. ROSATI[1], L. PIOTTOLI[2], A. CARTONI[2], A. DAL BOSCO[3], C. CASTELLINI[3]

The Journal of Applied Poultry Research Advance Access published April 23, 2014

Effect of range enrichment on performance, behaviour and forage intake of free-range chickens

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Primary Audience: Free-range Broiler Production Managers, Researchers, Geneticists, Production, Well-Being Auditors

SUMMARY

Transfer of bioactive compounds from pasture to meat in organic free-range chickens

A. Dal Bosco,[*,1] C. Mugnai,[†] S. Mattioli,[*] A. Rosati,[‡] S. Ruggeri,[*] D. Ranucci,[§] and C. Castellini[*]

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ABSTRACT The aim of this study was to analyze the transfer of bioactive compounds from the pasture to the body and meat of organic free-range chickens and to verify the effect of these compounds on the oxidative processes of the meat. Starting at 21 d of age, 100 male naked-neck birds were divided into two homogeneous groups: an indoor group (0.12 m^2/bird) and an outdoor group (0.12 m^2/bird indoor and 10 m^2/bird of forage paddock). At slaughter (81 d of age), blood samples were collected, and the carcasses were stored for 24 h at 4°C (20 birds/group). The grass samples had higher values of carotenoids, tocopherols, and flavonoids respect to standard feed (based on dry matter comparison). The polyunsaturated fatty acid (**PUFA**) content was also greater in grass, especially the n-3 series (so named because its first double bond occurs after the third carbon atom counting from the methyl at the end of the molecule). The antioxidant profile of the grass improved the antioxidant status of the crop and gizzard contents in the outdoor chickens. The higher antioxidant intake resulted in a higher plasma concentration of antioxidants in outdoor birds; thiobarbituric acid reactive substances (**TBARs**) and the antioxidant capacity of the plasma were also better in the outdoor than the indoor group. The meat of the outdoor birds had higher levels of antioxidants, mainly due to the higher amount of tocopherols and tocotrienols. Despite the higher antioxidant protection in the drumstick of the outdoor group, the TBARs value was greater, probably due to the kinetic activity of birds, the higher percentage of PUFAs, and the peroxidability index. In conclusion, grazing improved the nutritional value of the meat (PUFA n-3 and the ratio between n-6 and n-3 PUFA) with a minor negative effect on the oxidative stability. Suitable strategies to reduce such negative effects (e.g., reduction of kinetic activity in the last days of rearing) should be studied.

Key words: chickens, organic system, antioxidants, pasture

2016 Poultry Science 95:2464–2471
http://dx.doi.org/10.3382/ps/pev383

INTRODUCTION

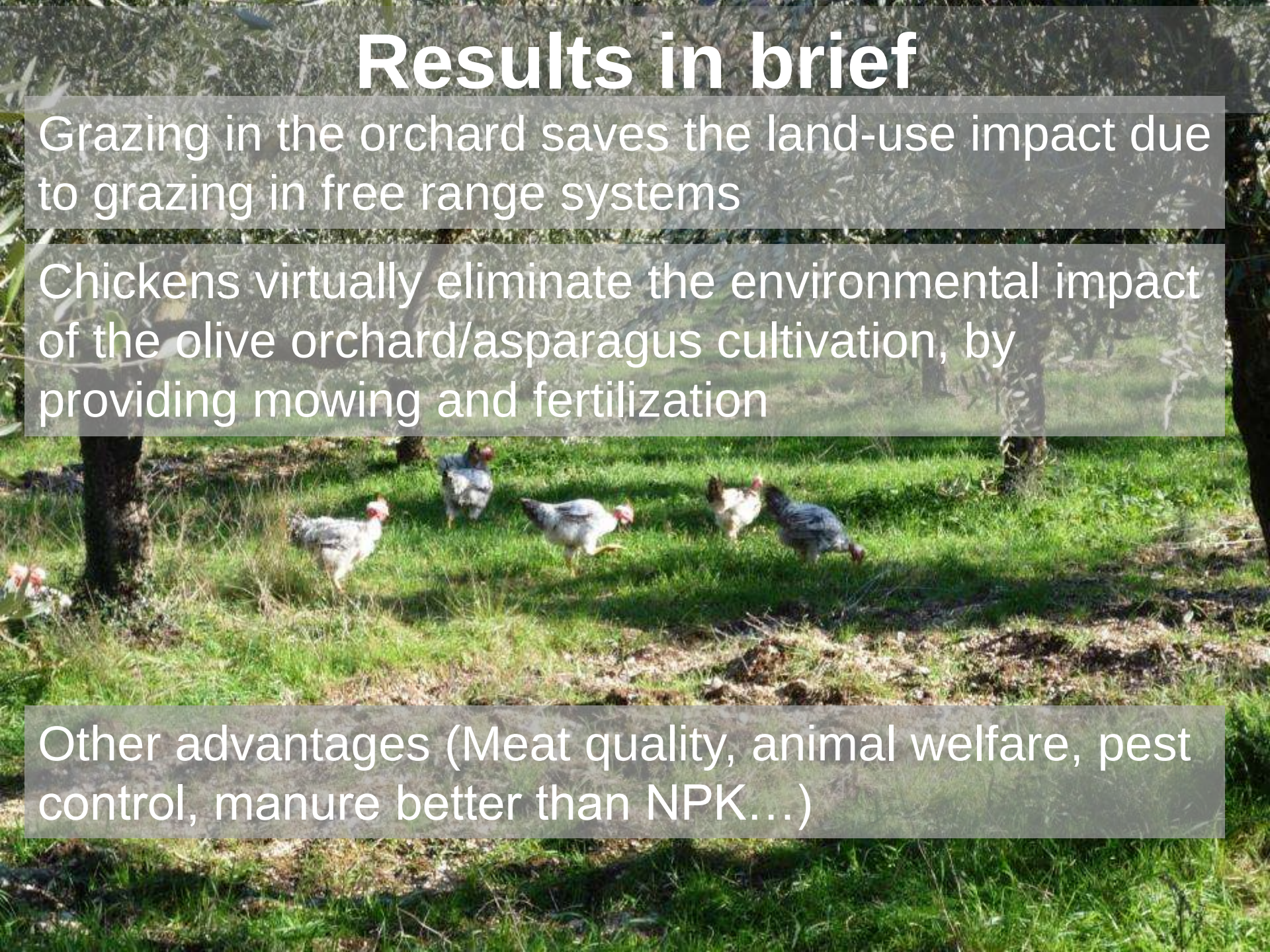
The effect of foraging in birds is complex, depend-

We evaluated the advantages of the olive-chicken conbination in tems of environmental impact using the LCA (Life Cycle Assessment)

Results in brief

Grazing in the orchard saves the land-use impact due to grazing in free range systems

Chickens virtually eliminate the environmental impact of the olive orchard/asparagus cultivation, by providing mowing and fertilization



Other advantages (Meat quality, animal welfare, pest control, manure better than NPK…)

Zoom avanti (Ctrl+0)

Contents lists available at ScienceDirect

Journal of Cleaner Production

journal homepage: www.elsevier.com/locate/jclepro

Combining livestock and tree crops to improve sustainability in agriculture: a case study using the Life Cycle Assessment (LCA) approach

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ARTICLE INFO

ABSTRACT

If you would like a copy, please let me know!

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impact by approximately 12%. By providing weed control and fertilization in the orchard, grazing also dramatically reduced the impact of the olive orchard for all of the categories considered, except for land use, which had the highest impact (70%). Therefore, the overall impact reduction with the chickens grazing in orchards was approximately 30%; however, this impact reduction approached 100% if land use was not considered. Additional benefits of combining poultry and orchard that are not considered in the LCA are briefly discussed. Although this was a case study with olives and poultry, the results are applicable to other combinations of livestock and crops, and show that such combinations provide significant reductions in the environmental impacts of agriculture. The results can be useful when developing guidelines to improve sustainability in agriculture.

Contents lists available at ScienceDirect

Journal of Cleaner Production

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Assessing the sustainability of different poultry production systems: A multicriteria approach

L. Rocchi [a,*], L. Paolotti [a], A. Rosati [b], A. Boggia [a], C. Castellini [a]

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Summarizing (olive+chicken+asparagus)

Olive yield unaffected

Asparagus yield: slightly lower (-30%), but with greater quality (yield)

Chicken yield: same as any free range chicken (+ advantages: protection, feed, well being, no antibiotics, > quality)

LER 2.7 !

Free online manual on Olive, wild asparagus, free range chicken polyculture

(In Italian, sorry)

olivo asparago pollo youtube - Cerca con Google - Windows Internet Explorer

http://www.google.it/#hl=it&output=search&sclient=psy-ab&q=olivo+asparago+pollo+youtube&oq=olivo+asparago+pollo+you&gs_l=h

Preferiti | olivo asparago pollo youtube - Cerca con Google

+Tu | Ricerca | Immagini | Maps | Play | YouTube | News | Gmail | Documenti | Calendar | Altro

Google

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Ricerca

Circa 12.300 risultati (0,30 secondi)

Tutto
Immagini
Maps
Video
Notizie
Shopping
Più contenuti

Perugia
Cambia località

Olivo Asparago selvatico, **Pollo** rustico - **YouTube**

www.**youtube**.com/watch?v=ALw73WwUr2o

NUOVO 1 giorno fa - 23 min - Caricato da ducanorcia

Progetto "**Olivo**, **asparago** selvatico, **pollo** rustico": innovazioni sostenibili del processo produttivo **...**

Altri video di **olivo asparago pollo youtube** »

11 mediagallery MediaGallery http://www.parco3a.org/Mediacenter ...

www.parco3a.org/mediacenter/API/XmlCategoria.aspx?id=11

... 285 211 **olivo-asparago-pollo Olivo**, **Asparago Pollo** ..... Canale **Youtube** del Mipaaf Visualizza i filamti del Mipaaf su **Youtube** guarda i video del Mipaaf **...**

TABELLA CALORIE

www.lascatoladeisegreti.it/tabellacalorie.htm

Petto di **pollo**, 110 Kcal. Coniglio, 114 Kcal. Filetto di manzo **...** Olio d'**oliva** (un cucchiaio), 108 Kcal. Olio d'**oliva**, 900 Kcal **... Asparagi**, 35 Kcal. Patate, 83 Kcal **...**

Another free manual

Manuale di progettazione del pascolo in allevamenti avicunicoli free range

EUROPE

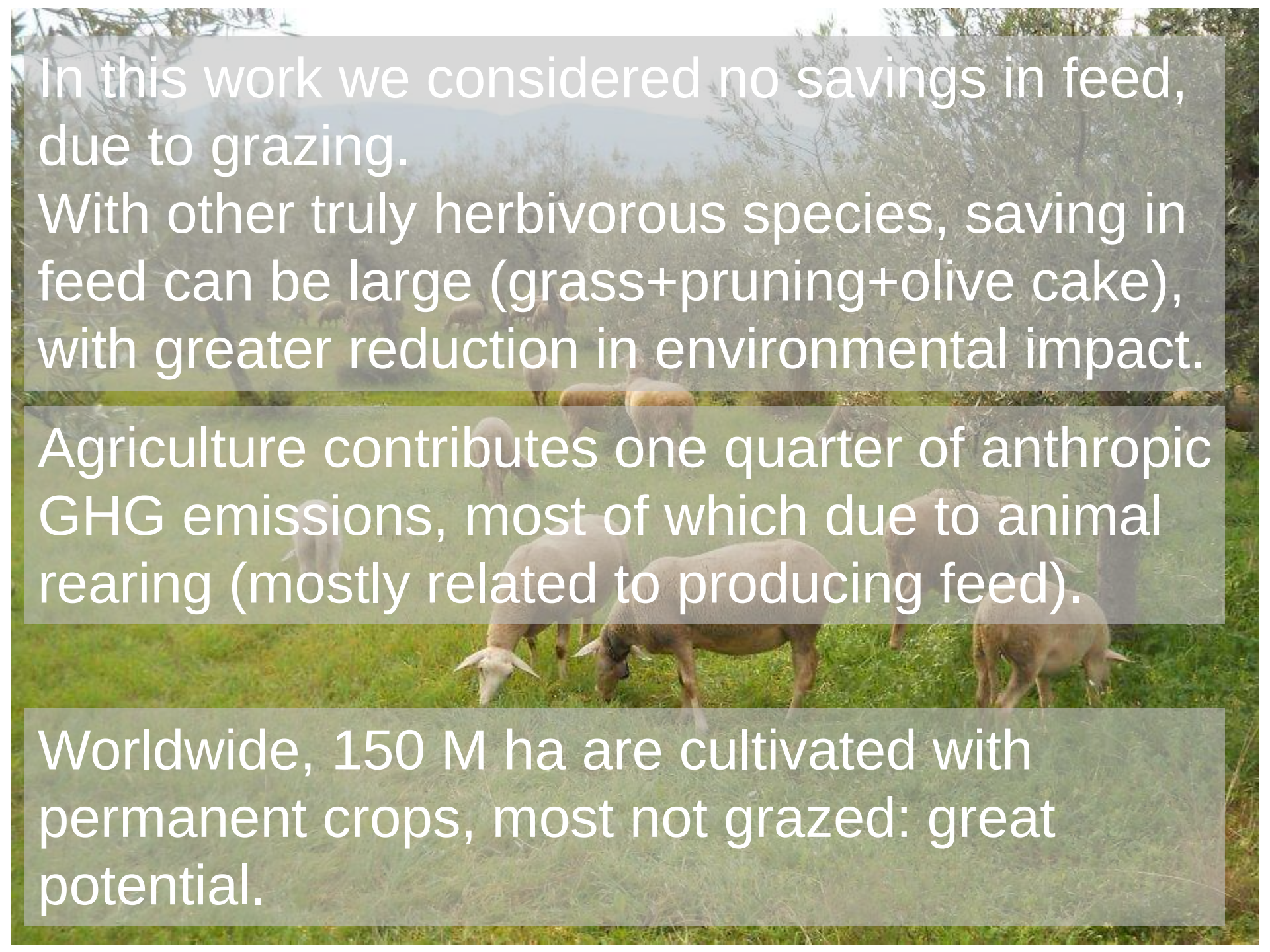
$$\frac{\text{4 billion chickens}}{\text{4 million ha olives}} = 1000 \text{ chickens/ha}$$

If 250 kg/ha fertilizer (N+P+K) are saved

Then, 1 billion kg of fertilizer are saved

1 kg fertilizer = 1 kg of fossil fuel

- 4 million tons of CO_2



In this work we considered no savings in feed, due to grazing.
With other truly herbivorous species, saving in feed can be large (grass+pruning+olive cake), with greater reduction in environmental impact.

Agriculture contributes one quarter of anthropic GHG emissions, most of which due to animal rearing (mostly related to producing feed).

Worldwide, 150 M ha are cultivated with permanent crops, most not grazed: great potential.

Agroforestry at our farm

Over 1200 varieties of fruit species!

Apple, Pear, Peach, Apricot, Cherry, Sour cherry, Fig, Persimmon, Almond, Pomogranate, Quince, Medlar, Cornelian cherry, Grape, Mulberry, Paw paw, Currents, Raspberry, Blackberry, Gogi, Jujube…

High-stem orchards grazed by sheep and occasionally cows

Sheep also graze the vineyard/wild asparagus

Sheep «carefully» weeding the wild asparagus

All our herbivores feed on olive pruning

Sheep also graze the forest (selective thinning cuts)

Of course we also have a Forest Garden
(collection of edible but unusual species)

Siberian pea tree

Caragana arborescens

Elaeagnus x ebbingei

Toona sinensis

Xantocera sorbifolia

Paw Paw, Chestnut, Giant Knotweed

Cornelian cherry (Cornus mas)

Acorns

Goji

Poncirus trifoliata

Ginko biloba

Loquat (Eriobotrya japonica)

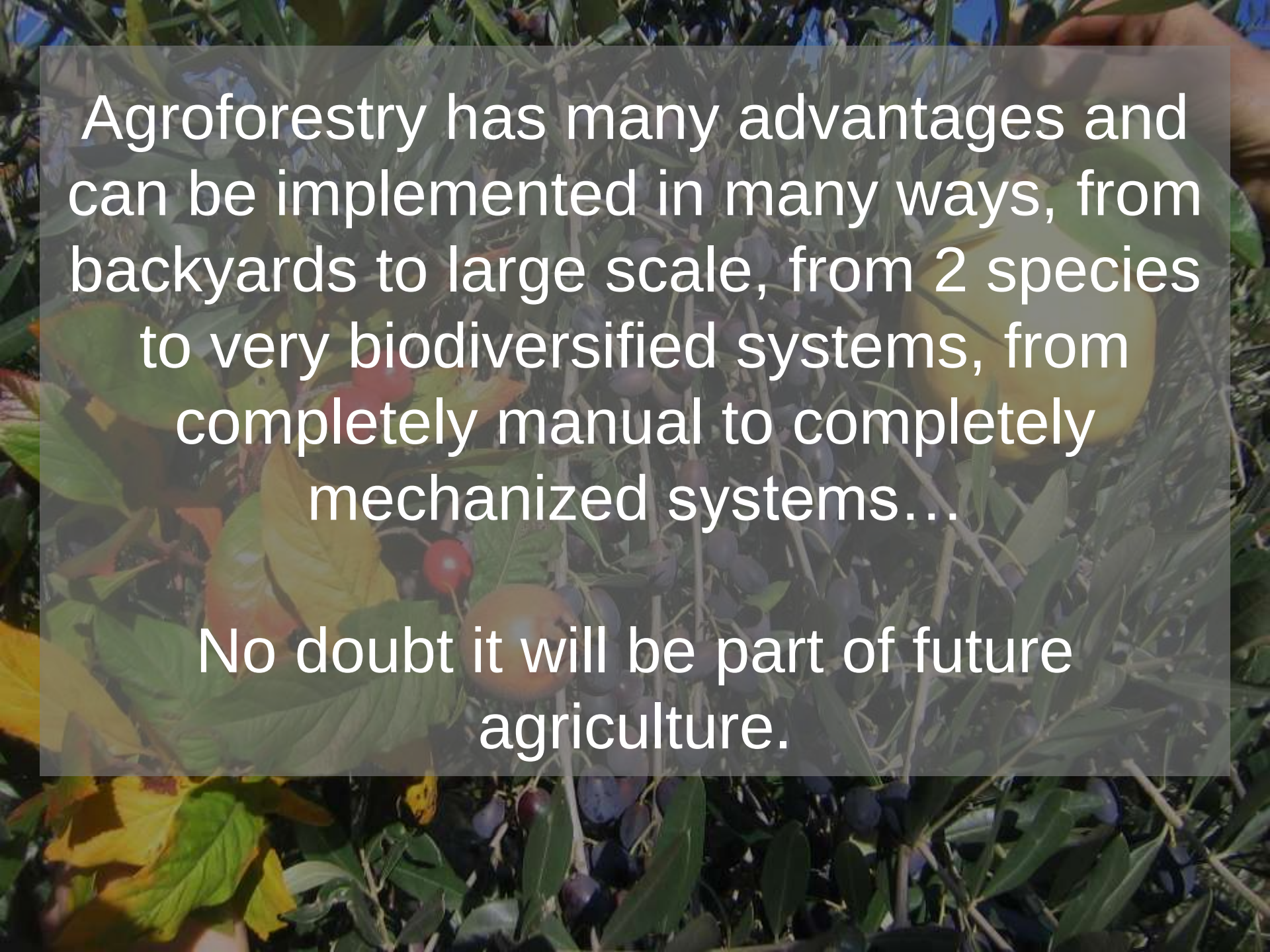
Raisin tree

Hovenia dulcis

Broussonetia kamciatka

Cornus kousa


What is the future of
agroforestry
and
forest gardening?



Agroforestry has many advantages and can be implemented in many ways, from backyards to large scale, from 2 species to very biodiversified systems, from completely manual to completely mechanized systems…

No doubt it will be part of future agriculture.


Carbon Neutral Brazilian Beef

Woodland eggs at supermarkets

Woodland egg experiment
Oxfordshire (2010)

- Woodland egg production
- Perceived welfare benefits for hens
- Estimated to be 200 woodland egg producers in UK

This Winery Employs 1,900 Sheep to Help With Its Grape Harvest

It's not a baaaad gig, if you can get it.

By Megan Friedman Feb 2, 2015

È stato eliminato. Annulla

Che cosa c'era di sbagliato nell'ann

- Ripetitivo
- Non sono interessato
- Già acquistato


Will forest gardens
feed the world?

Forest Gardens will probably not supply supermarkets…

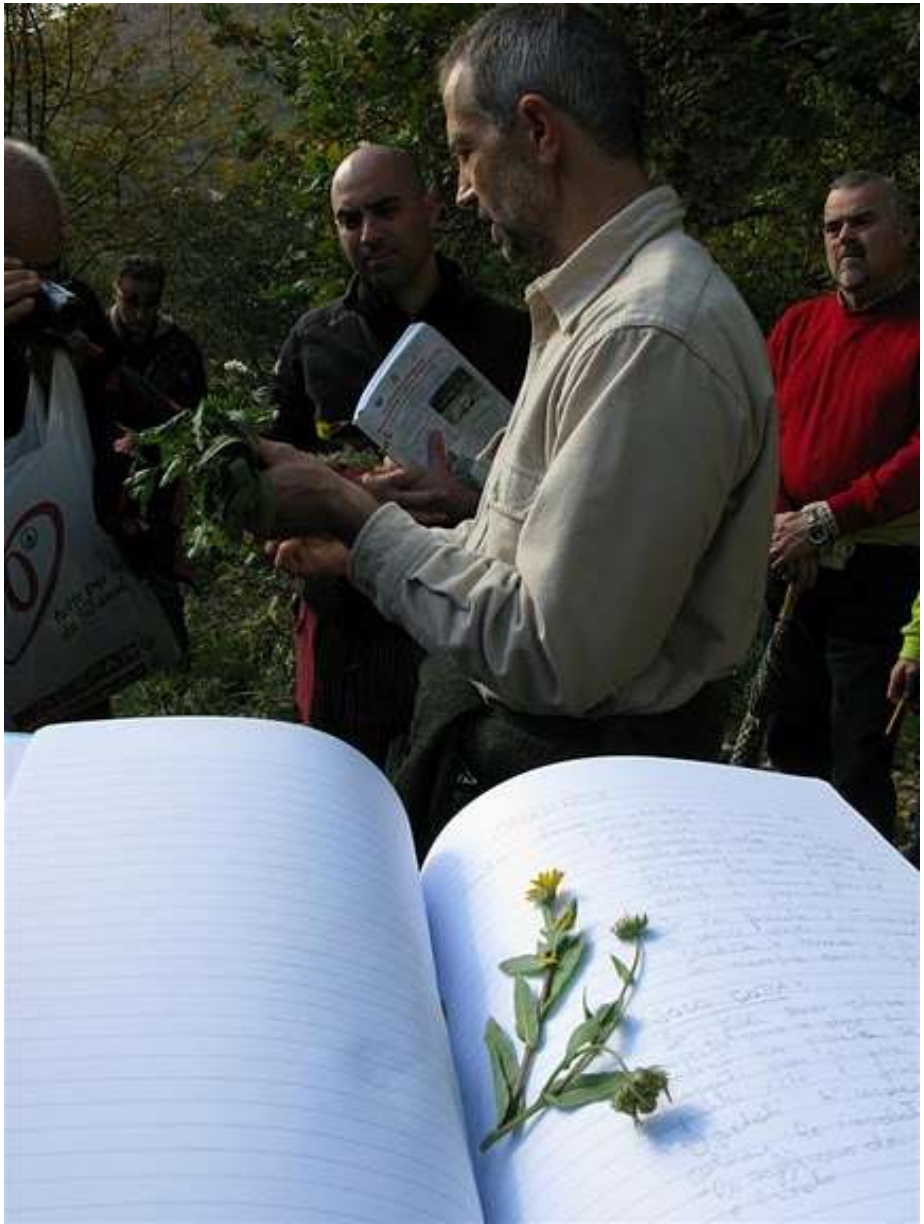
… probably not even CSA baskets.

Forest Gardens will probably partially replace more traditional home gardens… especially for home-consumption

Forest Gardens are a valuable asset in multifunctional farms, where people don’t buy just food, but also farm tours…

… entertainment…

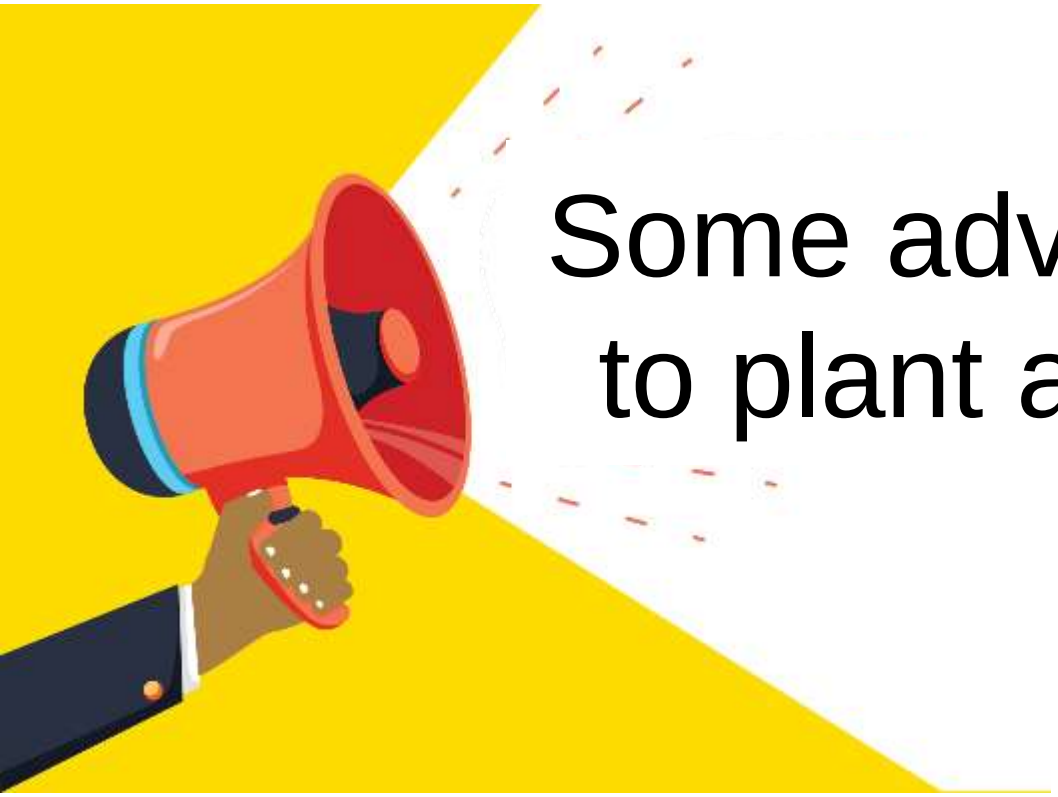
… education…



… meals…

… tasting of farm products…

… sell the added value of forest gardens…



Some advice of you want to plant a forest garden

You already have a forest garden!

Just go out in an unpolluted natural area or field, and forage: most of the food you can gather is similar to what you would grow in a forest garden.

If you already have an ornamental garden, many of the species there are likely edible, you just did not know.

Guide pratiche

Vita in CAMPAGNA

Riconoscere e cucinare

le buone erbe

Amaranto • Bardana • Borsa del
Cardo mariano • Casselle • Ch
Finocchio selvatico • Malva •
Rucole selvatiche • Stellaria • Strig

Guide pratiche

Vita in CAMPAGNA

Riconoscere e cucinare

le buone erbe

volume 2

lvatico • Balsamita • Caccialepre • Crispigni
Lampascioni • Luppolo • Mastrici • Margherita
mpinella • Pungitopo • Radicchiella • Raponzol
osella • Topinambur

Vita in CAMPAGNA

coltiva il tuo mondo unico

GUIDE PRATICHE

GIARDINO

I BUONI FRUTTI SELVATICI

Piante commestibili e insolite, spontanee o facilmente coltivabili nel tuo giardino-frutteto

What is your goal?

Mainly ornamental?
Educational?
Food provision?
Family consumption?
For market?
How much labour is available?
Do not visit for one afternoon, but volunteer work for a week!

Know and taste your species

Before you spend 15 years finding and then growing something until it bears fruit, only to discover it does not taste at all like you expected!

Will you (or your customer) eat that stuff?
Plant things you know you'll use!

Thank you

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https://localitailpiano.it/