



Coupling Olive, Poultry and Wild Asparagus in Multifunctional Olive Systems

Adolfo Rosati



Olive trees used to be grown in polycultures



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

Creating problems with
erosion, loss of fertility,
biodiversity...

Intensive



Super Intensive



To overcome problems,
green mulching is
increasingly adopted

Why then not use a
profitable/marketable
green mulch?





Does it make sense to intercrop an evergreen species?

In olive orchards, maximum oil yield @ 55% light interception (Villalobos et al. 2006).

45% light available for understory crops



70
60
50
40
30
20
10
0

Non-uniform light

In young orchards there is plenty more light

Yes

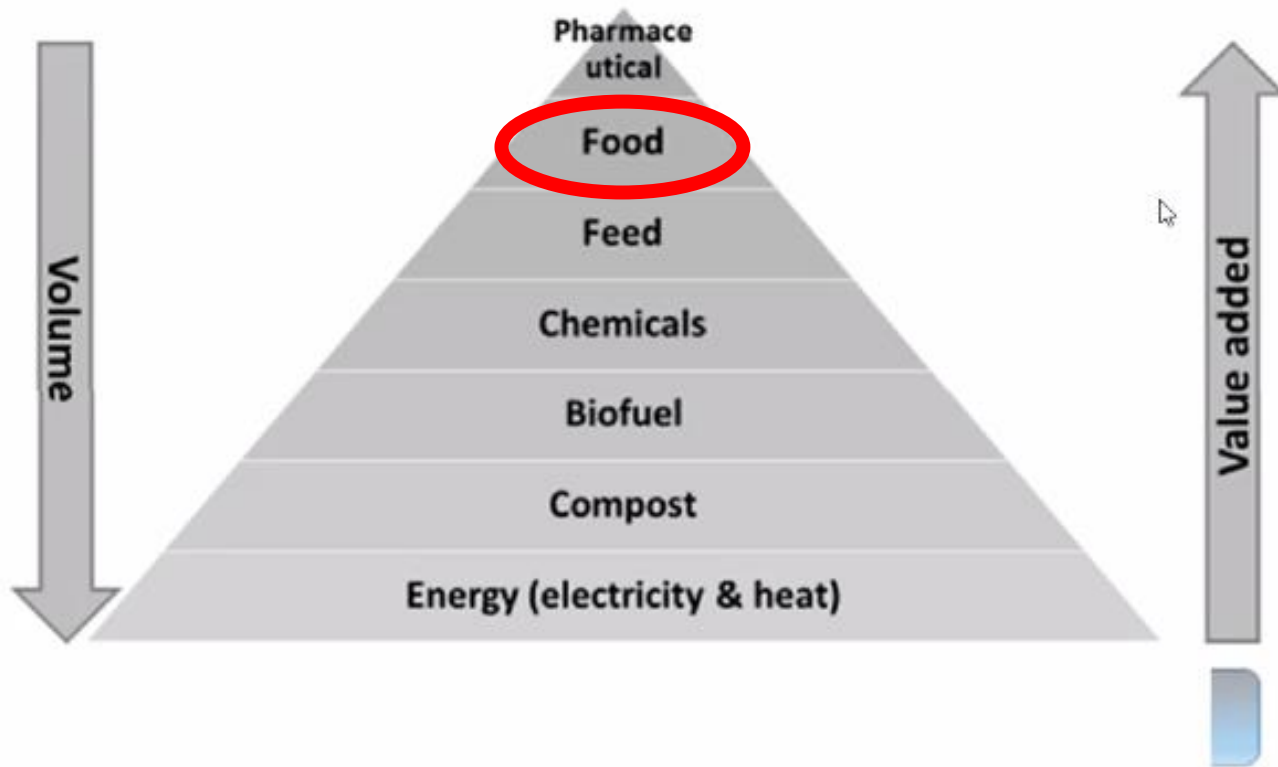
It makes sense to grow understory crops



What can we grow?



ALTERNATIVE USES OF OLIVE AND OLIVE OIL BY-PRODUCTS



Faba beans, chickpeas, vegetables, etc.
(Other speakers...)



Also wild edibles (naturally occurring)





















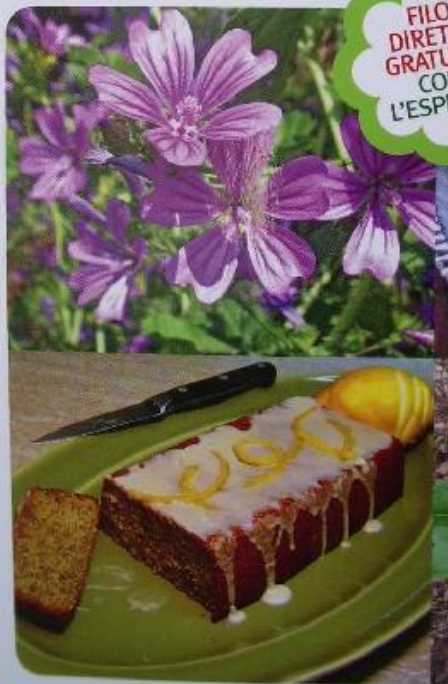


Guide pratiche

Vita in
CAMPAGNA

Riconoscere e cucinare le buone erbe

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



FILO
DIRETTO
GRATUITO
CON
L'ESPERTO

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



Guide pratiche

Vita in
CAMPAGNA

Riconoscere e cucinare le buone erbe

volume 2

Ilvatico • Balsamita • Caccialepre • Crispigni
Lampascioni • Luppolo • Mastrici • Margherita
mpinella • Pungitopo • Radicchiella • Raponzolo
osella • Topinambur

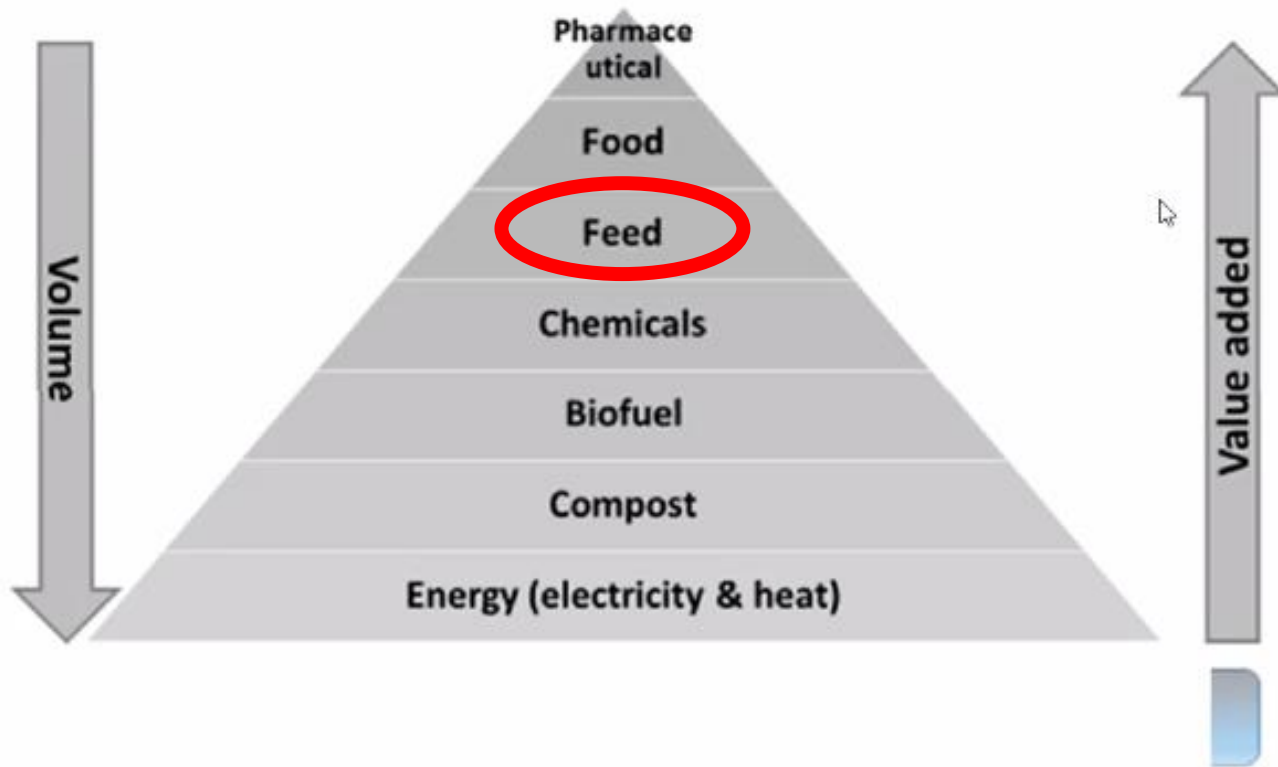


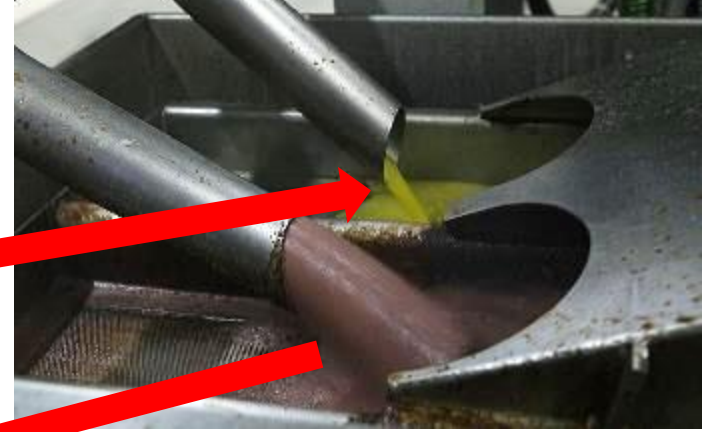
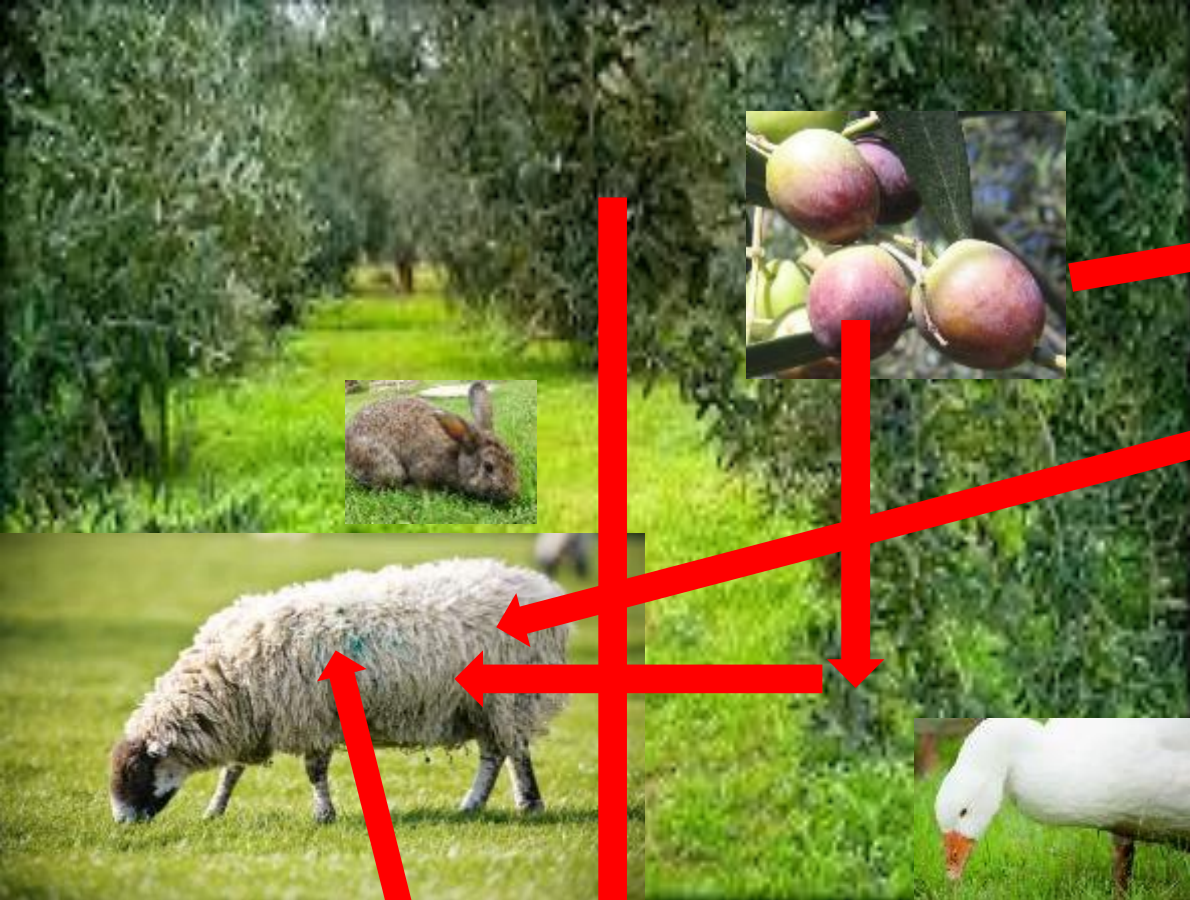
FILO
DIRETTO
GRATUITO
CON
L'ESPERTO

Don't throw away food!
Use also the edible weeds
(self-consumption or market)



ALTERNATIVE USES OF OLIVE AND OLIVE OIL BY-PRODUCTS





Olive orchards produce several sources of forage:

- 1) Grass
- 2) De-pitted cake
- 3) Pruning biomass
- 4) Fallen fruits



Not using them: big waste!



Using them increases yield,
But also health (human and
animals) and quality.
Condensed tannins...

The orchard provides feed, but also:

Shelter and shade

Protection against predators



Livestock need shade (exp. with climate change)

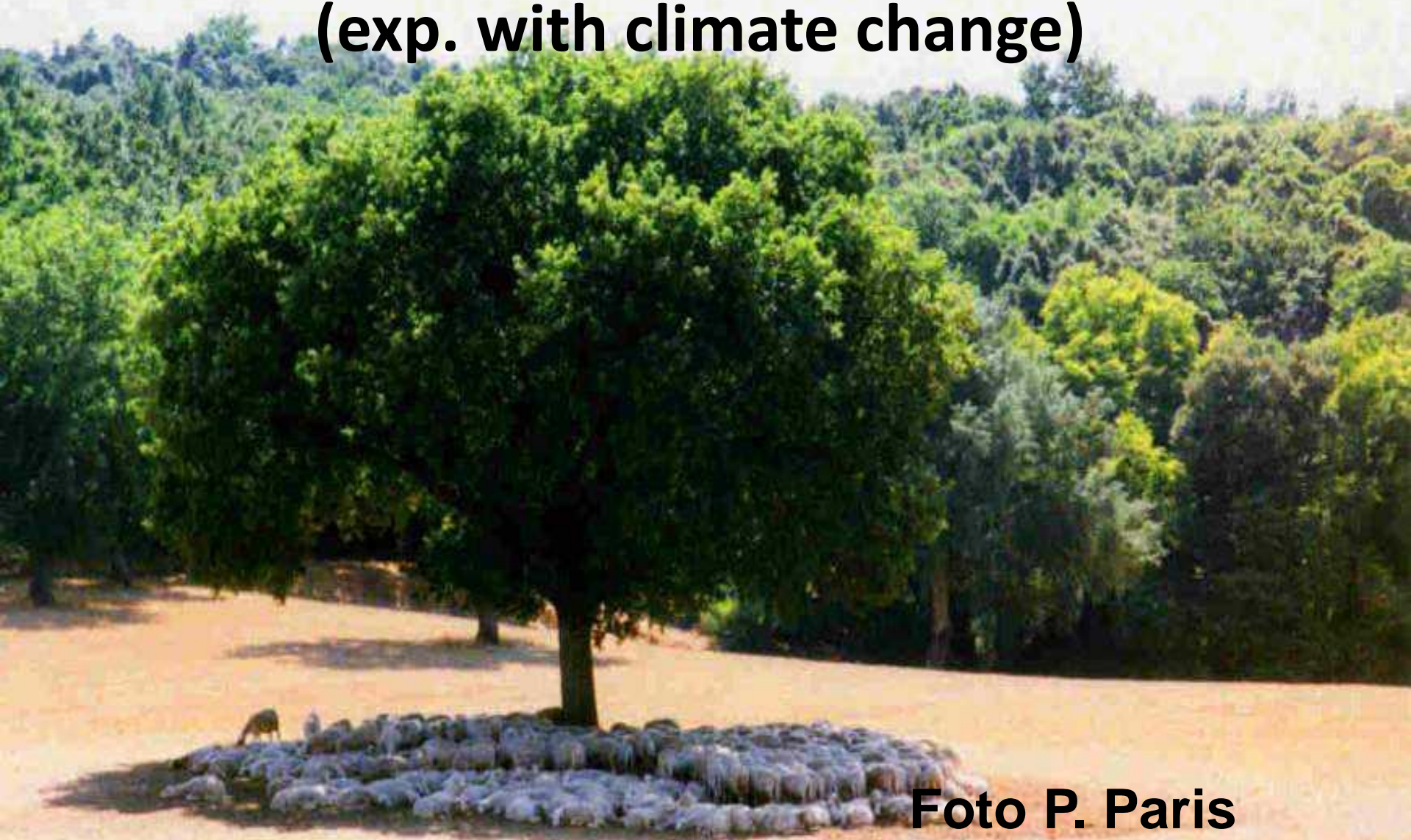


Foto P. Paris



United States Department of Agriculture

Climate Change, Heat Stress, and U.S. Dairy Production

Nigel Key, Stacy Sneeringer, and David Marquardt

Economic
Research
Service

Economic
Research
Report
Number 175

September 2014



In 2010, heat stress lowered the value of annual milk production for the average dairy by about \$39,000, which equates to **\$1.2 billion in lost production for the entire dairy sector.**

Climate model predictions indicate that, on average, U.S. dairies will experience an annual temperature increase between 1.45 and 2.37 degrees Fahrenheit by 2030.



Photo by João Palma

In turn, animals can provide:

Weeding

Fertilizing

Pest control





weeding with geese

Used for: **Strawberry, Cotton, Fruit trees, Vineyards, Nurseries**



Why Use Geese?

The most obvious benefit in using geese as weeders is to **eliminate or reduce the use of herbicides**. Herbicides can be expensive and potentially dangerous. With the growing concern over environmental and health problems associated with the use of herbicides on crops, as well as the economic incentives for farmers to market organically grown produce, there is a growing demand for weeder geese.

There are **less obvious benefits** as well.

Geese will **not compact the soil** as heavy machinery or people will. They will work **seven days a week, rain or shine**. They can be put into **wet fields** to work when machinery would bog down and cause severe damage to soil structure. Their agile necks allow them to **pull weeds close to and from within the crop plants**, where machine or hoe cannot. At the end of the season the grower can also process the geese for **meat and feathers**.

All of this is accomplished while the geese are naturally **spreading nitrogen-rich manure** all over the field.



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* by
the way, not *A. officinalis*!)
under olives?**



Additional crop, additional income

New crop, but existing market

Interesting price (10-30 €/kg)

Grows naturally under olive trees



Lacatena, il grossista che l'ha scoperto e lanciato

Successo dell'asparago di bosco sardo in Gdo

Uno specialista che ha fatto di un prodotto di nicchia un punto di forza. Dal Centro Agroalimentare di Roma (CAR) in cui ha sede, l'Ortofrutticola Lacatena commercializza l'asparago di bosco da oltre 40 anni. Non solo rifornisce tutti i mercati regionali della capitale e zone limitrofe, ma anche gli scaffali della Gdo, attraverso la rete di una grande realtà distributiva.



L'asparago di bosco dell'Ortofrutticola Lacatena, infatti, si trova nei punti vendita PAC2000A di Conad in Lazio, Umbria e Campania, all'interno dei quali vanta la presenza in esclusiva rispetto agli asparagi selvatici di qualsiasi altra azienda fornitrice.



Seedling production Wild Asparagus





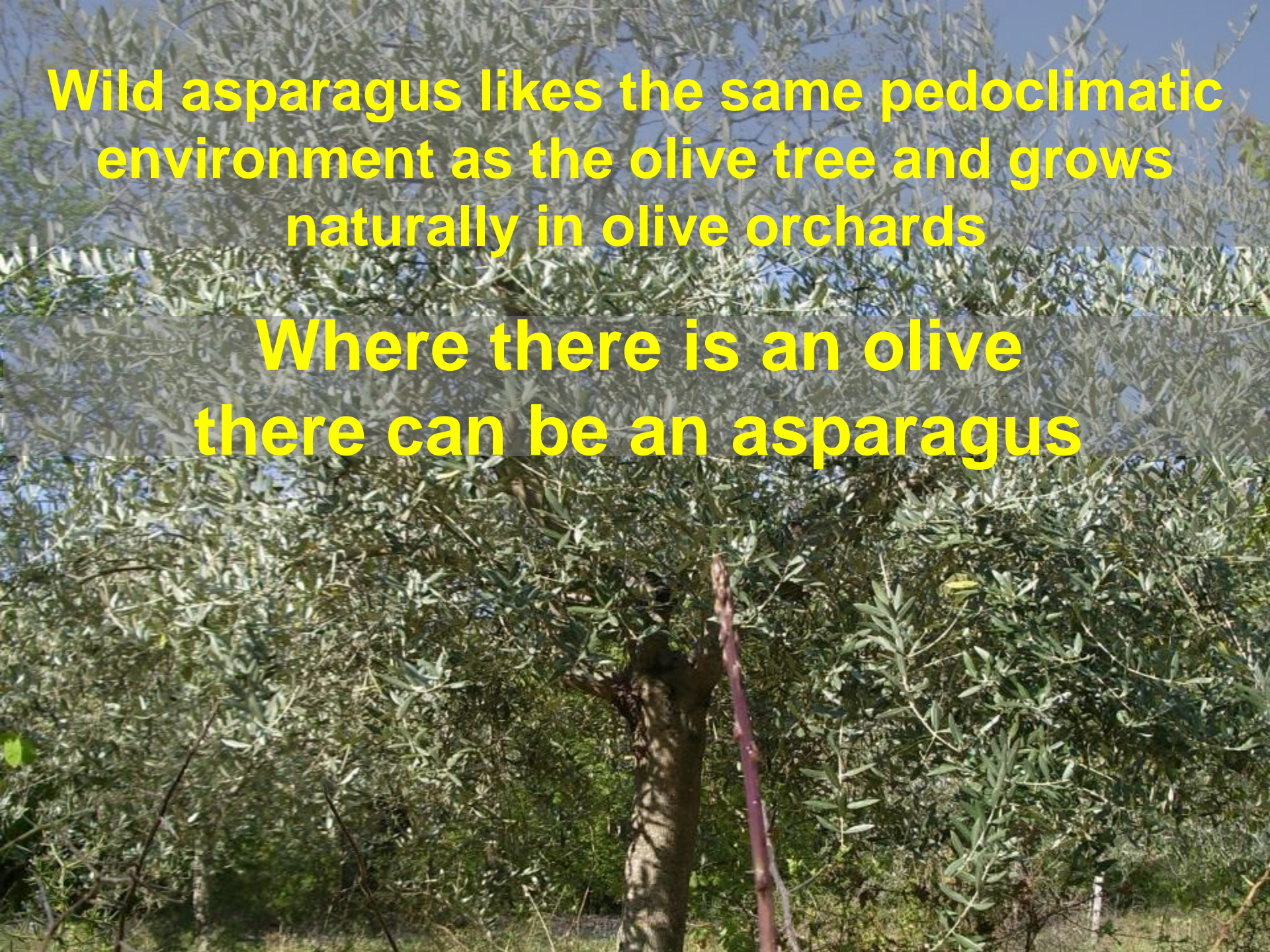






Wild asparagus likes the same pedoclimatic environment as the olive tree and grows naturally in olive orchards

Where there is an olive there can be an asparagus





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)

**But weeding is more
demanding with asparagus**



We asked chickens to help



A photograph of three chickens in a field. On the left is a white chicken with a red comb. In the center is a brown chicken with a red comb. On the right is a white chicken with black spots and a red comb. The background features several trees, a building with a red roof, and a fence. The ground is covered in dry leaves and grass. The text is overlaid on a semi-transparent dark green rectangle in the center of the image.

2-3 cycles/year
1000 chickens/ha/cycle
90-100 days/cycle



Chicken semi-movable housing



Effective weeding



Effective Fertilization



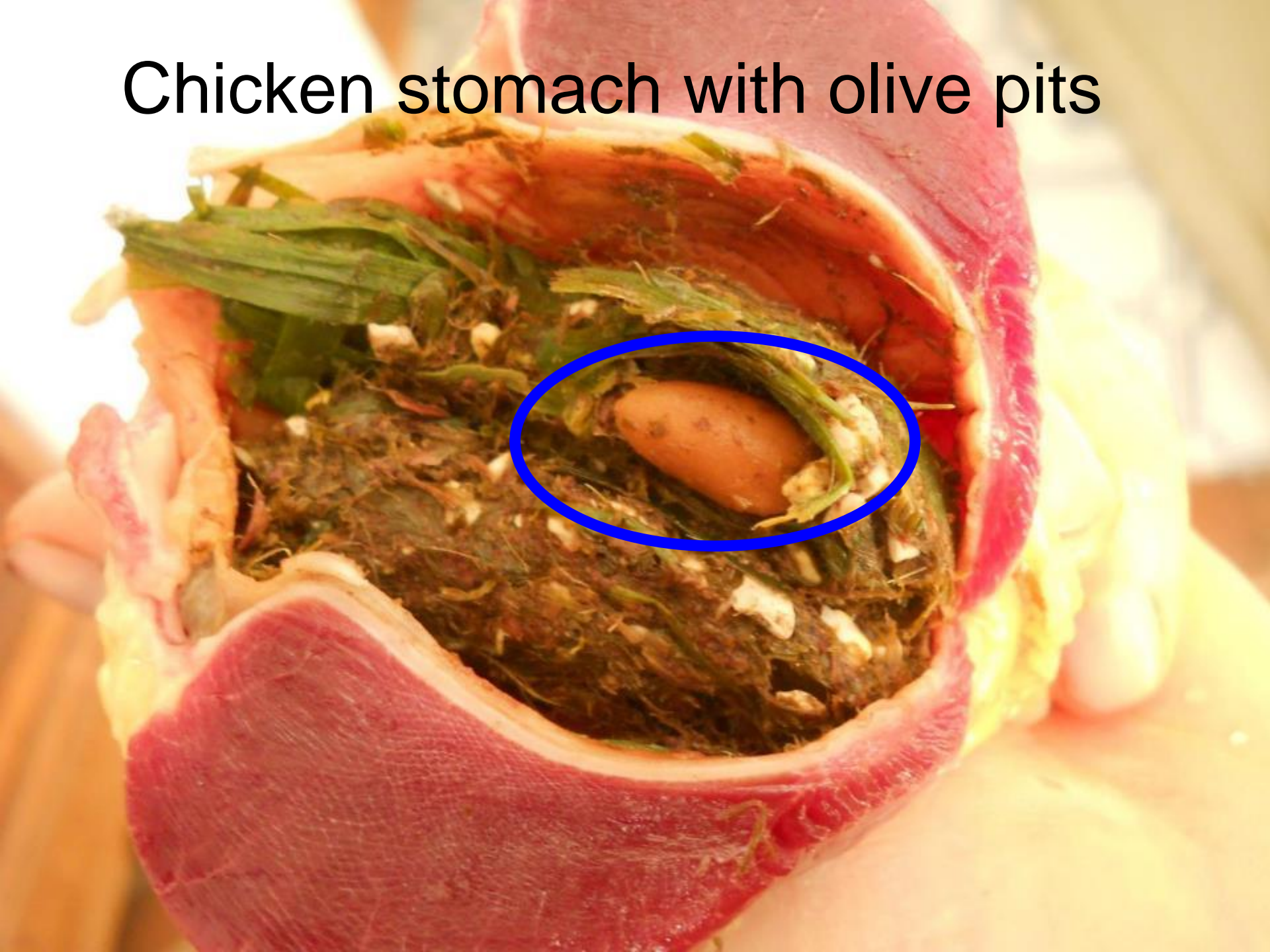
180 kg/ha N

220 kg/ha P₂O₅

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

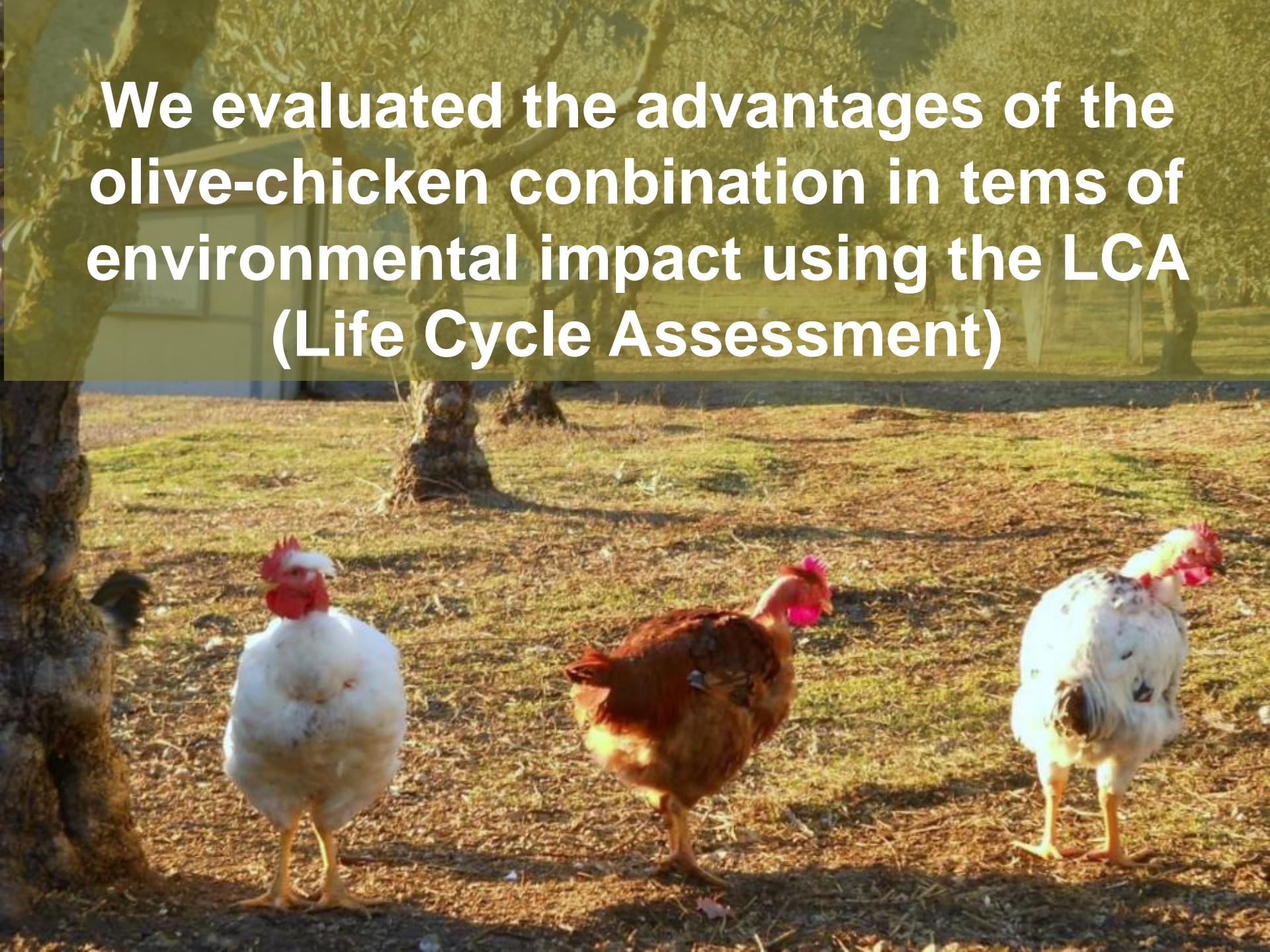


Chicken tractor





We evaluated the advantages of the olive-chicken combination in terms 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, lower use of antibiotics, manure better than NPK...)



Summarizing (olive+chicken+asparagus)

1 ha of polyculture = 1 ha of olive + 0,7 ha of asparagus + 1 ha free range chickens



While reducing costs and environmental impact

EUROPE

5 billion chickens

5 million ha olives

= 1000 chickens/ha

If 250 kg/ha fertilizer (N+P+K) are saved
Then, 1.25 billion kg of fertilizer are saved

1 kg fertilizer = 1 kg of fossil fuel

- 5 million tons of CO₂

Conclusions

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 nor intercropped: great potential.