

Field data (Each questionnaire refers to one crop species cultivated per field)

Municipality : Montecarotto

Latitude : 43.522491

Longitude : 13.055585



Field Size (ha) 2.14

Crop Species

| | | | |
|-------------------------------------|---|-------------------------------------|----------------------------------|
| <input type="checkbox"/> olives | <input checked="" type="checkbox"/> vineyards | <input type="checkbox"/> apples | <input type="checkbox"/> pears |
| <input type="checkbox"/> peaches | <input type="checkbox"/> apricot | <input type="checkbox"/> nectarine | <input type="checkbox"/> plum |
| <input type="checkbox"/> cherries | <input type="checkbox"/> oranges | <input type="checkbox"/> tangerines | <input type="checkbox"/> lemons |
| <input type="checkbox"/> grapefruit | <input type="checkbox"/> hazelnuts | <input type="checkbox"/> chestnuts | <input type="checkbox"/> almonds |

Variety of crop _____

Age of crop _____

Density of crop (trees/ha) _____

Width between cultivated rows (m) 3.1

Distance between trees (m) _____

Crop form

Crop forms for vineyard



Vase



Espalier



Marquee

Crop forms for Olive



Ancient olives



Vase (1 stem)



Vase (2-3 stems from soil)



Bush (intensive 250-600 trees/ha)



Superintensive (>1500 trees/ha)

Crop forms for fruit trees



Natural



Vase



Bush/Globe (very small trees)



Spindle/Pyramid



Palm/Fan



Epsilon transversal

Slope (%)

20

Soil Cover



Bare.No grass cover.
Tillage several times per year



Seasonal occurrence.
Herbicides+mowing
<50% soil cover



>50% grass cover.
Mowed several times per year



100% Grass cover.
Mowed several times per year

Crop Yield

Average Crop yield (t/ha)

Crop yield before measurement (t/ha)

Amount of product obtained for the year that the pruning measurement is performed in tonnes per hectare

Irrigation

rain fed

partial irrigation

fully irrigated

Intensification degree

Specify the amount of fertilizer and pesticides

organic

low

intermediate

high

Pruning Operations Performed

Type of pruning

- | | |
|---|--|
| <input checked="" type="checkbox"/> Maintenance <input type="checkbox"/> Structuring <input type="checkbox"/> Removal of old branches | <input type="checkbox"/> Grafting <input type="checkbox"/> Topping <input type="checkbox"/> Blooming |
|---|--|

Pruning Method

- | | |
|--|--|
| <input checked="" type="checkbox"/> Only manually <input type="checkbox"/> Fully mechanised | <input type="checkbox"/> Mechanised pre-pruning + manual |
|--|--|

Pruning Operations

Specify the pruning operations that are carried out. Check as many as apply.



- Manually shears



- Assisted shears



- Chainsaw/armchainsaw



- pre-pruner:hedge trimmer



- pre-pruner:discs



- pre-pruning topping

Season of pruning

- | | | | |
|------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| <input type="checkbox"/> January | <input type="checkbox"/> February | <input type="checkbox"/> March | <input type="checkbox"/> April |
| <input type="checkbox"/> May | <input type="checkbox"/> June | <input type="checkbox"/> July | <input type="checkbox"/> August |
| <input type="checkbox"/> September | <input type="checkbox"/> October | <input type="checkbox"/> November | <input type="checkbox"/> December |

Frequency of pruning

- annual
 biannual
 biennial
 Once per years

Mechanized Collection

Preparation of the field prior to harvesting



No preparation - prunings were left on the soil as they fall from tree



Centre-operator position prunings on the center of the lane between tree rows



Centre aligned-operator position prunings in a specific position in center (e.g. aligned with the direction of the row)
















Previous windrowing-a tractor with windrower is used prior pruning harvester

Integrated windrower to the pruning machine

Harvesting methods

Check according to the figures below the harvesting method that is used for the pruning biomass

| | | |
|---|---|-------------------------------------|
|  | Manual cross-cutting of firewood+gathering at field side | <input type="checkbox"/> |
|  | Forestry chipper towed by tractor + manual feeding | <input type="checkbox"/> |
|  | Hauling the branches + shredding/chipping at field side | <input type="checkbox"/> |
|  | Hauling the branches + baling at field side | <input type="checkbox"/> |
|  | Harvest with mulcher/chipper in front | <input type="checkbox"/> |
|  | Harvest with mulcher/chipper at rear | <input type="checkbox"/> |
|  | Harvest with rear mulcher/chipper and bin | <input type="checkbox"/> |
|  | Harvest with rear mulcher/chipper and big-bags | <input type="checkbox"/> |
|  | Automotive shredder/chipper with rear trailer | <input type="checkbox"/> |
|  | Harvest with standard hay baler | <input type="checkbox"/> |
|  | Harvest with rear baler prepared for wood or tree branches | <input checked="" type="checkbox"/> |
|  | Pre-pruning integrated with collection and mulching/chipping | <input type="checkbox"/> |
|  | Pre-pruning integrated with collection and mulching/chipping in an automotive machine | <input type="checkbox"/> |

Type of pruning treatment and model of machinery

Specify the method that prunings are treated based on the outcome product and manufacturer-model of each machinery (windrower,mulcher,chipper,baler) that is used if applicable



Windrower-Machines that align biomass in a row

Windrower (manufacturer-model) _____



Mulcher-big pieces. Machines that break the branches in big pieces. Normally they are an evolution from the typical mulchers/crunchers utilised to leave the branches on the soil in pieces.

Mulcher (manufacturer-model) _____



Shredder - Produce finer material (hammers or hammers with a knife.Do not produce a clear cut)

Shredder (manufacturer-model) _____



Chipper - Clean cut. Resembles the typical form of forest woodchips

Chipper (manufacturer-model) _____



Round bale

Baler (manufacturer-model) _____



Squared bale

Baler (manufacturer-model)

Ledra 900L

Processes Specifications

Specify the specifications of the processes (manpower, gross working time, productivity, fuel consumption)

Check as many as apply

| Processes | Manpower (Nr of persons) | Gross working time (hr/ha) | Productivity (t/ha or t/hr) | Fuel consumption (l/hr) |
|------------------------------------|-------------------------------------|----------------------------------|--------------------------------|-------------------------------|
| Manual Alignment | <input type="checkbox"/> | | | |
| Windrowing | <input type="checkbox"/> | | | |
| Integrated harvesting/treatment | <input checked="" type="checkbox"/> | <u>1.73</u> | <u>1.15 t/hr</u> | |
| Hauling | <input type="checkbox"/> | | | |
| Treatment at field side | <input type="checkbox"/> | | | |
| Disposal/dumping of biomass | <input type="checkbox"/> | | | |

End product properties

Specify the properties (moisture, bulk density, particle size, ash) of the prunings after treatment and harvesting, if known

| | | | |
|-----------------------------------|-------------------|---------------------------|-----------------------------|
| Moisture (% a.r.) | <u>44 wet bas</u> | Particle size (cm) | <u> </u> |
| Bulk density (kg/m ³) | <u>0.215</u> | Ash content (% dry basis) | <u> </u> |

Losses of biomass after harvesting

(%) or (tonnes/ha)

Problems encountered due to the field

- | | |
|--------------------------------------|---|
| <input type="checkbox"/> Soil uneven | <input checked="" type="checkbox"/> Slope |
| <input type="checkbox"/> Stones | <input type="checkbox"/> Too much grass |

Problems encountered by the machines

- | | |
|---|---|
| <input type="checkbox"/> Not suitable for the pruning | <input type="checkbox"/> Manouvering |
| <input type="checkbox"/> Unsuitable feeding system (biomass difficult to be conveyed) | <input type="checkbox"/> Too much soil particles with the biomass to be treated |
| <input type="checkbox"/> Problems in discharge | |

Performance of the machinery

- The machinery was performing better than expected
- The machinery was performing normally-typical expected
- The machinery was underperforming

Value Chains

Indicate if your experience is based on an isolated test or if it based on an existing value chain:

- My experience is just an experimental trial-machinery test
- My experience is part of an existing value chain

Contact Data

Name : Raffaele Spinelli

Email : spinelli@ivalsa.cnr.it

Phone : _____

Profession : Researcher

Country : Italy

References-External links:Provide references on which the information is based on or highlight any comments

Raffaele Spinelli ,Natascia Magagnotti, Carla Nati, Harvesting vineyard pruning residues for energy use, Biosystems Engineering Volume 105, January 2010, Pages 316-322

