Characterisation of main pests on plum tree

Method/protocol submitted by:

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Objectives of the method/protocol:

Quantifying 3 diseases (brown rot, powdery mildew, shot-hole of plum, red rust of stone fruit) and 7 sorts of animal pests (plum fruit moth, aphids, plum sawfly, thrips, tortrix moths, scales, mites) on plum, at the field scale.

Brief description of the method/protocol:

This protocol presents a visual non destructive quantification method based on abundance classes to quantify diseases and animal pests on plum.

Possible uses of this method/protocol (in which sorts of situation could it be appropriate?):

Characterisation of pest pressure in a region.
The protocol is currently used by technical advisers in the Tuscany region in Italy. The data collected on several farm is aimed at editing weekly phytosanitary and phenological reports for farmers.

Method/protocol:

- Observation unit:

The observation unit is the field.

- Abundance classes:

Each field is assigned to a qualitative abundance class for each of the animal pests or diseases studied.
The observations are carried out each weak. The diseases and animal pests observed depend on the moment of the year.
The date and sort of the last treatment in each field are noted.
The abundance classes for the different pests are presented in the tables below:

- Brown rot (*Monilinia fructigena*)

  - Presence:

Visual observation of the field allows the experimenter to assign it to one of the following classes, depending on the infestation level:

Level	**Description**
Absence	no symptom on the leaves
Low	a few plants in the field show low-level symptoms (5-10% of attacked organs)
Medium	the majority of the plants shows low-level symptoms (5-10% of attacked organs), or some plants show high-level symptoms (more than 30% of attacked organs)
High	the majority of the plants show high-level symptoms (more than 30% of organs with symptoms)

  - Sort of attacked organ:
    - No organ of the tree attacked
    - The exterior is attacked (spring)
    - The fruits are attacked (summer)

- Shot-hole of plum (*Coryneum beijerinckii*)

Visual observation of the field allows the experimenter to assign it to one of the following classes, depending on the infestation level:

Level	**Description**
Absence	no symptom
Low	a few plants in the field show low-level symptoms (1-5% of attacked organs)
Medium	the majority of the plants shows low-level symptoms (more than 5% of attacked organs), or some plants show high-level symptoms (more than 30% of attacked organs)
High	the majority of the plants show high-level symptoms (more than 30% attacked organs)

- Red rust of stone fruit (*Tranzschelia pruni-spinosae*)

Visual observation of the leaves allows the experimenter to assign the field to one of the following classes, depending on the infestation level:

Level	**Description**
Absence	no symptom
Low	a few plants in the field show low-level symptoms (1-5% of attacked leaves)
Medium	the majority of the plants shows low-level symptoms (more than 5% of attacked leaves), or some plants show high-level symptoms (more than 30% of attacked leaves)
High	the majority of the plants show high-level symptoms (more than 30% attacked leaves)

- o Plum fruit moth (*Cydia funebrana*) on fruits

  - Infestation level:

Visual observation of the fruits allows the experimenter to assign the field to one of the following classes, depending on the infestation level of the field:

Level	**Description**
Absence	no symptom in the field
Low	a limited number of fruits (1-2%) are injured by plum fruit moth
Medium	about 2% of the fruits are injured by plum fruit moth
High	More than 2% of the fruits are injured by plum fruit moth

  - Characterisation of the infestation:

The main development stage present in the field is indicated according to the following categories:

Development stage	**Description**
Absence	no plum fruit moth in any development stage observed. No symptoms observed
Eggs	eggs of plum fruit moth are observed on the fruits
Larvae	larvae are observed in the fruits
Signs of former presence of larvae in the fruits	no larvae are observed in the injured fruits but signs of former presence is visible (holes where the larvae went in/out of the fruits)

- o Aphids

Visual observation of the leaves allows the experimenter to assign the field to one of the following classes, depending on the infestation level:

Level	**Description**
Absence	no symptom
Low	a few trees in the field show low-level symptoms (1-10% of attacked shoots)
Medium	the majority of the plants shows low-level symptoms (more than 10% of attacked organs), or some plants show high-level symptoms (more than 30% of attacked organs)
High	the majority of the plants show high-level symptoms (more than 30% attacked leaves)

- o Plum sawfly (*Hoplocampa minuta*)

Visual observation of the field allows the experimenter to assign it to one of the following classes, depending on the infestation level of the field:

Level	**Description**
Absence	no symptom observed
Presence, treatment realised	injuries are visible on the fruits but are limited by a treatment
Presence, no treatment realised	Injuries are visible on the fruits, no treatment has been realised yet

- o Thrips

Visual observation of the field allows the experimenter to assign it to one of the following classes, depending on the infestation level of the field:

Level	Description
Absence	no symptom observed
Presence, treatment realised	injuries are visible but are limited by a treatment
Presence, no treatment realised	Injuries are visible, no treatment has been realised yet

o Tortrix moths

- Infestation level:

Visual observation of the field allows the experimenter to assign it to one of the following classes, depending on the infestation level of the field:

Level	Description
Absence	no symptom observed
Presence, treatment realised	injuries are visible but are limited by a treatment
Presence, no treatment realised	Injuries are visible, no treatment has been realised yet

The main species of tortrix moth present is noted:

- No species of tortrix moth present
- The main species present is *Pandemis heparana*
- The main species present is *Archips rosana*
- The injuries are caused mainly by other species than the ones mentioned above

o Scales

Visual observation of the field allows the experimenter to assign it to one of the following classes, depending on the infestation level of the field:

Level	Description
Absence	no symptom observed
Presence, treatment realised	colonies are visible but are limited by a treatment
Presence, no treatment realised	colonies are visible, no treatment has been realised yet

o Mites

Visual observation of the field allows the experimenter to assign it to one of the following classes, depending on the infestation level of the field:

Level	Description
Absence	no presence of mites
Low	presence of mites on some leaves (10-20%) of a limited number of trees (5-10%). Presence of *Phytoseiidae*
Medium	presence of mite injuries on more than 20-50% of the leaves of more than 10% of the trees, or on all the leaves of a limited number of trees (2-5%). Absence of *Phytoseiidae*
High	Presence of mite infestation on more than 50% of the leaves of more than 10% of the trees

Advantages / Disadvantages of the method/protocol:

Field monitoring takes about 20-40 minutes/farm and it can be carried out by one advisor.

References or examples of studies carried out by using this method/protocol:

Web-site of Agroambiente: http://agroambiente.info.arsia.toscana.it/arsia/arsia?