# Integrative characterisation of eight plant-parasitic nematode species on olive trees in central Tunisia

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**Time zone (Tunis, Tunisia)=UTC+1**

## Background

- Olive trees host a large number of plant-parasitic nematodes (PPN); being estimated in over 250 species documented worldwide in the main olive producing countries [1] .
- In Tunisia, olive culture is of high agriculture and socio-economic importance with a wide distribution of this crop.
- Nematofauna associated to olive in Tunisia still not well known.

## Objective

Unravel the diversity of PPN inhabiting the rhizosphere of cultivated olive trees (*Olea europaea* subsp. *europaea* var. *europaea*) in central Tunisia (Mahdia, Sousse, Kairouan and Kasserine).

## Material and Methods

- A survey was conducted between 2013 and 2015, comprising 22 commercial olive orchards (cvs. Chemlali and Koroneiki). About 300 soil samples were collected.
- Integrative taxonomic approaches (morphological, morphometrical, molecular and phylogenetic analyses) were carried out for some species.
- Molecular characterisation using D2-D3 expansion regions of 28S rRNA, partial 18S rRNA, ITS1-rRNA, and cytochrome c oxidase subunit 1 (*coxI*) was carried out.

## Results

- Eight plant-parasitic nematode species level were identified with frequencies of prevalence as following: *Pratylenchus oleae* (4.5%), *Rotylenchus incultus* (18.2%), *R. eximius* (13.7%), *Longidorus euonymus* (4.5 %), *L. glycines* (13.7 %), *Xiphinema conurum* (13.7 %), *X. meridianum* (13.7 %) and *X. robbinsi* (9.1 %).
- ***P. oleae*****:** only females, lip region slightly offset with three annuli, stylet (14.5-17.0) µm long with prominent rounded knobs, long pharyngeal overlapping (22-36) µm, tail short, conoid-rounded to subcylindrical, usually annulated terminus (**Fig.1**).
- ***R. incultus:*** female lip region hemispherical with three rarely four annuli, stylet (21.5-27.5) µm long, tail hemispherical terminus regularly annulated, male spicules (22-33) µm long and gubernaculum (9.5-16.0) µm long (**Fig.2**).
- ***R. eximius****:* female lip region hemispherical clearly off set, with four to five annuli, stylet (32-36) µm long, tail broadly rounded, male rarely present (**Fig.3**).
- ***L. euonymus***: only females, lip region slightly expanded the body contour, rounded and flattened frontally, tail conical, bluntly with broady rounded terminus (**Fig. 4**).
- ***L. glycines****:* lip region distincly expanded, hemispherical separated from the rest of the body by constriction; female tail short, broadly conoid with a rounded terminus; male tail with spicules ventrally curved with 15 supplements (**Fig. 5**).
- ***X. conurum***: female with rounded lip region offset, uterine with pseudo-Z-organ comprising small granular bodies and spines, tail conical, curved dorsally with acutely rounded terminus (**Fig. 6**).
- ***X. meridianum***: female with expanded lip region offset, uterine with pseudo-Z-organ including four or five granular bodies plus small spines, tail subdigitate-conoid with acutely rounded terminus (**Fig. 7**).
- ***X. robbinsi***: high lip region, female uterine with only spiniform structures, female tail dorsally convex-conoid, rounded with or without central bulge. Male presenting two or three pairs of ventromedian supplements (**Fig. 8**).

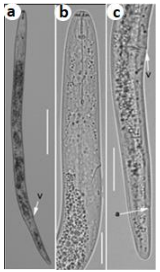


**Fig.1: *P.oleae***

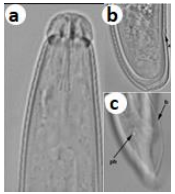


**Fig.2: *R.incultus***

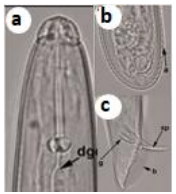


**Fig.3: *R. eximius***


**Fig.4: *L. euonymus***


**Fig.5: *L. glycines***

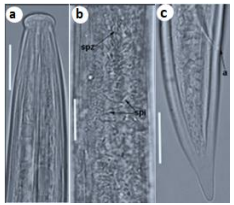


**Fig.6: *X. corunum***

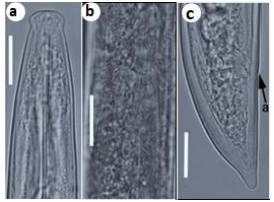


**Fig.7: *X. meridianum***

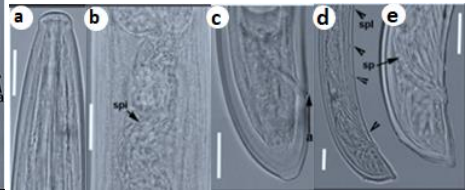


**Fig.7: *X. robbinsi***

**Fig.1**: *P.oleae*; a:whole female; b: anterior region; b: posterior region
**Fig.2**: *R. incultus;* **Fig.3**: *R. eximius;* a:lip region; b: female tail; c: male tail
**Fig.4**: *L. euonymus;* **Fig.5**: *L. glycines;* a: female lip region; b: female tail
**Fig.6**: *X. conurum;* **Fig;7**: *X. meridianum;* **Fig.8**: X. robbinsi; a:lip region; b: uterine differentiation; c: female tail; d-e: male tail

## Conclusion

P. oleae was a new species described, *R. incultus*, *R. eximius*, *L. euonymus*, *L. glycines*, *X. conurum*, *X. meridianum* and *X. robbinsi* were detected for the first time on cultivated olive.

## Reference

1 Ali, et al. 2014. Plant-parasitic nematodesassociated to olive tree (*olea europaea* L.) with a focus on the mediterranean basin: A review. Comptes Rendus Biologies, 337, 423–442.