UDK 632:595.132(497.16)

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## OVERVIEW OF REPORTS ON PLANT NEMATOLOGY IN MONTENEGRO UNTIL 2012

### **SUMMARY**

Relatively little is known about the role of plant-parasites, and nematodes in general, in relation to crop production in Montenegro. As the main source for this overview, we considered published scientific papers with topics covering nematodes and nematosis from Montenegro. We considered all the extension reports connected with nematodes in Montenegro. Above all, we used data gleaned from a survey of twenty greenhouses in the Zeta-Bjelopavlici valley.

This paper constitutes an historical overview by years of publication, papers or reports. As we consider this report to be the very first inventory of Montenegrin nematodes, we describe all the nematodes species or taxons of nematodes that are determinate in Montenegro, by crops.

In total, 65 different plant-parasites, nematofiders, bacteriofiders, free living species, and taxons of nematodes have been reported.

**Keywords:** Overview, nematode species, nematode taxons.

### INTRODUCTION

Relatively little is known about the role of plant-parasites, and nematodes in general, in relation to crop production in Montenegro.

Montenegro is situated in south-east Europe on the Balkan peninsula. The country can be divided into several regions according to climate, geology, water supply, population, and other factors. Taking into account the agricultural factors, we can divide it into four distinct regions: the Coastal area, the Karst area, the Zeta-Bjelopavlici valley, and the region of high mountains and deep valleys. Among them, the Zeta-Bjelopavlici valley is the most significant in terms of agricultural production.

Montenegro has a Mediterranean/Continental climate. The average monthly temperature throughout the country during the year is  $13.1^{\circ}$ C, with an average annual precipitation of 1,436.03 mm. There are 140 rainy days per annum and the average air humidity is 71 (SYM, 2009; Pavićević, 1983).

The area of the country developed for agriculture is 516,219 hectares. There are 189,300 hectares of arable area, 324,269 hectares of pasture, and 2,650 ponds, including fishponds and marshes. Arable fields and gardens are on 45,237

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hectares, orchards on 11,885, vineyards on 4,325, and meadows on 127,853 hectares. In 2008, the forests covered 627,000 hectares (SYM, 2009).

This report is the first comprehensive inventory of nematodes from Montenegro. Therefore, it is important to at least mention every nematode species or taxon of plant parasite and free living nematode that has been described in Montenegro up to the year 2012.

### MATERIAL AND METHODS

This overview is sourced mainly by published scientific papers on the topic of nematodes and nematosis in Montenegro. We also considered all extended reports connected with Montenegrin nematodes from other institutions outside the country, not just published materials.

What follows is primarily an historical overview of papers and reports, going by years of publication. Since we consider this report to be the very first inventory of Montenegrin nematodes, we present all nematode species or taxons of nematodes currently found in Montenegrin crops. While documenting native species is naturally the focus of this paper, it has become increasingly important to mention imported parasitic- and non-parasitic nematodes for each crop.

Above all, we use data taken from a survey of 20 greenhouses in the Zeta-Bjelopavlici valley. We surveyed various types of greenhouses from the valley. Soil and root tissue samples were collected from these 20 sites in 2006 and 2007. The soil was mixed in the laboratory and a 200g sub-sample was taken for nematode extraction. Each sub-sample was processed for nematodes using decanting techniques. Whenever a plant was observed to show system symptoms of a possible nematode problem (stunting, wilting, yellowing) during the soil sampling process, the root system was removed from the soil, assigned a root-knot nematode gall index number (0-5) and returned to the laboratory for mechanical extraction of root-knot nematode females for species identification.

### RESULTS AND DISCUSSION

Historical overview

The oldest data is from a 1968 paper published by Krnjajić, which provided information about *Xiphinema americanum* from Herceg Novi on vineyards, *Macroposthonia annulata* and *M. ferniae* from Meljine on wild hosts, and *Oxydirus oxycephalus* in the same locality of vineyards and citruses.

In 1975, Grujičić published information about *Meloidogyne* spp. from Kotor, where for the first time in Montenegro the non-determined species was found on a spinach crop.

Some ten years later, in 1985, authors Dimitrijević and Ivezić reported a significant number of nematode taxa in potato fields near the city of Pljevlja. The following taxa were reported in a plant protection extension report: Aphelenchus spp, Criconemoides spp, Diphterophora spp, Ditylenchus spp, Ditylenchus spp, Ditylenchus spp, Ditylenchus spp, Longidorus spp, Mononchus spp, Paratylenchus spp, Pratylenchus spp, Pratylenchus spp, Pratylenchus spp,

Psilenchus spp, Rotylenchus spp, Rotylenchulus spp, Trichodorus spp, Tylenchorhynchus spp, Tylenchus spp and Xiphinema spp. In the same year, a book about nematodes in ex Yugoslavia was published. The book-atlas (Alphey et al, 1985) is an important source for phytoparasitic species with important, but incomplete data. The book is essentially a map of nematode species found in the ex-federal state, but it lacks precise collection data and information detailing the herbs attacked by these nematodes.

In 1988, two extension reports were done by two groups of scientists: the first was done by Dimitrijević and Ivezić and the second by Jovičić and Stamenković. A scientific paper was published by Vučinić and Tiodorović, and it is the first and only collection of data about presence of *Tylenchulus semipenetrans* in Montenegro on citruses. In the first extension report Dimitrijević and Ivezić observed species of *Ditylenchus mycelophagus*, *Heterodera* spp, *Hoplolaimus* spp, *Meloidogyne* spp, *M. nassi*, *M. arenaria* and *Rhabditis* spp. In the second, Jovičić and Stamenković found *Aphelenchus* spp, *Criconemoides* spp, *Ditylenchus* spp, *Dorylaimus* spp, *Enoplida* spp, *Helicotylenchus* spp, *Hoplolaimus* spp, *Longidorus* spp, *Meloidogyne* spp, *Mononchus* spp, *Pratylenchus* spp, *Rhabditis* spp, *Tylenchorhynchus* spp and *Tylenchus* spp.

However, in total, there have been 20 reports or publications about the nematodes of Montenegro. The majority of these, during the 1990s to the early 2000s, have been accounted for under the occurrence, taxonomy, and morphology of *Longidorus* and *Xiphinema* spp. Barsi produced a diligent series of papers on the Longidoridae species from Montenegro. In 1989, Barsi wrote the first report on Longidoridae, detailing it throughout Yugoslavia and parts of Montenegro. In 1994, the same author reported the discovery of Xiphinema pachtaicum in Ulcini and Valdanos on P. aquilinum, X. diversicaudatum from Stoliv on vineyards and X. simile from Ulcini on P. aquilinum. In 1996, that same author reported once more the presence of X. diversicaudatum in Stoliv on vineyards, but in 1998 he reported the presence of X. varium from Crkvine on oak trees and X. montenegrinum from Morinj on the wood samples. In 1999, Barsi discovered X. illyricum in Danilovgrad on Carpinus orientalis, and during the year 2000, Barsi and Krnjajić et al made research contributions on the topic of Longidoridae, with a report of X. index and X. diversicaudatum in Morinj on vineyards. Over the next couple years, Longidorus piceicola were reported in Žabljak on Abies alba (Barsi 2001), and Xiphinema pachtaicum in Lazi-Budva, Morini and Petrovac on grassland (Barsi 2002); L. intermedius was reported in Lazi-Budva on Quercus spp (Barsi 2004) and X. pachtaicum in Ulcinj and Podgorica on vineyards by Pajović et al in the year 2007.

Between 2006 and 2010, a survey of greenhouses in Zeta-Bjelopavlici valley was carried out by the author of this article. Published data was primarily restricted to plant-parasitic nematodes, but data related to free-living taxons has not yet been published. Through the survey of greenhouses the following nematodes have been found: *Meloidogyne* spp, *M. incognita*, *M. javanica*, *M.* 

arenaria, M. hapla, M. ardeniensis, Aphelenchoides spp, Acrobeloides spp, Cephalobus spp, Dorylaimus spp, Eucephalobus spp, E. oxyuroides, Gracilacus spp, Helicotylenchus pseudorobustus, H. platyurus, H. vulgaris, Mesodorylaimus spp, Panagrellus spp, Plectus spp, P. tenuis, Poikilolaimus oxycerca, Pratylenchus neglectus, Rhabditis spp and Rotylenchulus macrodoratus spp.

### *Nematodes by plants*

This section will be organised by the importance of plants in production and by the importance of the described nematodes.

### - On Vineyards-

Production of grapes and grape products, primarily wine and brandy, is of critical importance in Montenegro. Vineyards cover some 4,325 hectares, with 18,166,311 plants and 2.61 kilograms of yield per plant. Of the total number of plants, 50.93% are on private farms and 49.07% are on enterprises or collective farms (SYM, 2009). For the grapevine, all growing systems can be divided into traditional – pergola and conventional – trellis systems. Production is entirely market oriented, mainly for export, and it comprises a quite significant share of the GDP.

As of 2012, there were several cases of nematodes reported on the vineyards in Montenegro, as presented in Table 1.

Nematodes	Location	Year	Reporter/s
Oxydirus oxycephaloides	Meljine	1968	Krnjajić
(Oxydirus oxycephalus) DeMan,			
1921			
Xiphinema americanum Cobb,	Herceg Novi	1968	Krnjajić
1913			
Xiphinema diversicaudatum	Stoliv, Stoliv,	1994;	Barsi; Barsi; Barsi
(Micoletzky, 1927) Cohn &	Morinj	1996;	and Lamberti
Sher, 1972		2000	
Xiphinema pachtaicum	Ulcinj	2007	Pajović, Urek,
(Tulaganov, 1938) Kirjanova,	Podgorica		Širca
1951			

Table 1. Nematodes found in vineyards in Montenegro until year 2012.

There has been no regular monitoring of the Montenegrin vineyards, so all data have been collected sporadically. There is no nematode management, either. Up to now there has been no recorded crop loss due to nematosis, or any other problems in production caused by nematodes.

### - On Potatoes-

By 2008, potatoes covered 10,233 hectares, with 13.11 t/ha of yield (SYM, 2009). The entire production is market-oriented using conventional production methods on private properties.

Nematodes	Loc.	Year	Reporter/s
Aphelenchoides spp	Pljevlja	1985	Dimitrijević, Ivezić
Aphelenchus spp	Pljevlja	1985	Dimitrijević, Ivezić
Criconemoides spp	Pljevlja	1985	Dimitrijević, Ivezić
Diphterophora spp	Pljevlja	1985	Dimitrijević, Ivezić
Ditylenchus spp	Pljevlja	1985	Dimitrijević, Ivezić
Ditylenchus intermedius (DeMan, 1880) Filipjev, 1936	Pljevlja	1985	Dimitrijević, Ivezić
Ditylenchus myceliophagus Goodey, 1958	Ulcinj	1988	Dimitrijević, Ivezić
Dorylaimus spp	Pljevlja	1985	Dimitrijević, Ivezić
Heterodera trifolii Goffart, 1932	Pljevlja	1985	Dimitrijević, Ivezić
Helicotylenchus spp	Pljevlja	1985	Dimitrijević, Ivezić
Longidorus spp	Pljevlja	1985	Dimitrijević, Ivezić
Mononchus spp	Pljevlja	1985	Dimitrijević, Ivezić
Paratylenchus spp	Pljevlja	1985	Dimitrijević, Ivezić
Pratylenchus spp	Pljevlja	1985	Dimitrijević, Ivezić
Psilenchus spp	Pljevlja	1985	Dimitrijević, Ivezić
Rotylenchus spp	Pljevlja	1985	Dimitrijević, Ivezić
Rotylenchulus spp	Pljevlja	1985	Dimitrijević, Ivezić
Trichodorus spp	Pljevlja	1985	Dimitrijević, Ivezić
Tylenchorhynchus spp	Pljevlja	1985	Dimitrijević, Ivezić
Tylenchus spp	Pljevlja	1985	Dimitrijević, Ivezić
Xiphinema spp	Pljevlja	1985	Dimitrijević, Ivezić

Table 2. Nematodes found in potato crops in Montenegro until year 2012.

As demonstrated in Table 2, previous research has been carried out on Montenegrin potato fields. All data presented are taken from unpublished reports from the Ministry of Agriculture, Forestry and Water Management, produced by scientists of other ex-Yugoslav republics.

Since 2007, the Government of Montenegro has made an effort to reduce the importation of potatoes from abroad, for both consumption as well as seed. For this reason, among others, a nematological monitoring of domestic seeding potato production has been established. The monitoring is focused on tracing and detecting potato cyst nematodes (PCN): *Globodera pallida* (Stone) Behrens and *G. rostochiensis* (Wollenweber) Behrens, on the basis of the Council Directive 2007/33/EC and Directive 69/465/EEC. As of 2011, PCN has not been discovered in Montenegro.

## - On Vegetable Crops-

We consider open field vegetable production, and vegetable production in greenhouses in particular, to be crucial to Montenegro's agricultural production.

Compared to all other plants grown in Montenegro, vegetable production in greenhouses and in the open field is certainly the most vulnerable to nematological attack. According to statistical data, there were 45,237 hectares of arable fields and gardens and 18,145 hectares of vegetable crops in 2008 (SYM, 2009). Unfortunately, it is not possible to distinguish participation among

different crop systems in vegetable production, but it is interesting to note that the fields used for vegetable production are very small, suggesting that this type of production is more likely to be small scale conventional farming.

According to our knowledge and experience, the most important plant in the parasitic nematodes genus, in open field vegetable production, is the *Meloidogyne*, as Grujičić (1975) noted for the first time in Montenegro on spinach, in the town of Kotor, in the coastal region.

What we have noticed is that in this kind of production, parasitic nematodes are not as destructive as they are in greenhouses. Our opinion is that open field living conditions in Montenegro are not optimal for nematodes, and that is why we do not see a significant increase in its population. In the course of a year, temperature increase, precipitation, and soil and air humidity decrease until the end of the summer, as is the case in other Mediterranean countries. With pure irrigation systems, nematodes cannot reach population levels high enough to become a significant plant health problem. On the other hand, in the greenhouses, they are one of the main limitations of production.

### - On Vegetable Crops in Greenhouses-

The production of vegetables in greenhouses in Montenegro has increased significantly in recent years. Since 2003, 50 hectares of new vegetable greenhouses have been constructed and put into operation. It is estimated that an additional 200 hectares will be developed within the next few years. As before, we can consider the whole production to be market oriented with conventional production on private properties. The production is significant, but it is not as vast as it can be in the other countries of the region. Even so, we can consider this production to be the most affected by nematosis in Montenegro, meaning that it has been previously scrutinised. We will present the data of other authors and the results of surveys conducted during 2006-2010 in greenhouses near Podgorica.

The most important plant-parasitic nematodes were recovered from all but one of the 20 vegetable greenhouses sampled. *Meloidogyne incognita* was the most common plant-parasitic nematode species detected in the Montenegro greenhouses, recovered from 11 of the 19 greenhouses infested with root-knot nematodes. *Meloidogyne arenaria* was recovered from three of the locations, while *M. javanica*, *M. hapla* and *M. ardeniensis* were only detected in one location each. Multiple species of *Meloidogyne* were recovered from three locations. The result of the nematode survey indicates that *Meloidogyne* spp are common in Montenegro vegetable greenhouses and can result in major losses in crop productivity. *M. incognita* can cause major losses of tomato, cucumber, pepper and lettuce under greenhouse conditions. Although it was the most common root-knot nematode species detected, the greenhouse with the most consistent root gall index equal to or above value of 3.0 (Pajović et al, 2007 b).

Among the plant parasitic nematodes we registered were nematodes from the genus *Gracilacus* (Raski, 1962); *Pratylenchus neglectus* (Rensch, 1924) Filipjev & Schuurmans Stekhoven, 1941; *Rotylenchus macrodoratus* Dasgupta, Raski & Sher, 1968; *Helicotylenchus pseudorobustus* (Steiner, 1914) Golden, 1956; *H. platyurus* (Perry, Darling & Thorne, 1959); *H. vulgaris* Yuen, 1964 and nematodes from the genus *Aphelenchoides*. All infestations with other parasitic species were concomitant with one or more species of *Meloidogyne* spp (Pajović, 2010) (Table 03.).

Among the free living nematodes we registered were nematodes from the genus *Cephalobus* Bastian, 1865; *Eucehalobus* Steiner, 1963, *E. oxyuroides* (de Man, 1895) Steiner 1936; *Acrobeles* Linstow, 1877; *Chiloplacus* Thorne, 1937; *Panagrellus* Thorne, 1936; *Rhabditis* Dujardin, 1845; *Poikilolaimus* Fuchs, 1930, *P. oxycerca* de Man, 1895; *Plectus* Bastian, 1865, *P. tenuis* Bastian, 1865; *Dorylaimus* Dujardin, 1845 and *Mesodorylaimus* Andrássy, 1959 (Table 3.).

Table 3. Nematodes found in greenhouses in Montenegro by 2012.

Nematode	Location	Date	Authors/Reporters	
Acrobilus spp	Podgorica	2006/2007	Pajović, Quintanilla, Bird	
Aphelenchoides spp	Podgorica	2006/2007	Pajović, Quintanilla, Bird	
Aphelenchus spp	Podgorica	1988	Jovičić, Stamenković	
Acrobeloides spp	Podgorica	2006/2007	Pajović, Quintanilla, Bird	
Cephalobus spp	Podgorica	2006/2007	Pajović, Quintanilla, Bird	
Chiroplacus spp	Podgorica	2006/2007	Pajović, Quintanilla, Bird	
Criconemoides spp	Podgorica	1988	Jovičić, Stamenković	
Cuticularia oxycerca	Podgorica	2006/2007	Pajović, Quintanilla, Bird	
Ditylenchus spp	Podgorica	1988	Jovičić, Stamenković	
Dorylaimus spp	Podgorica	1988	Jovičić, Stamenković	
Doryiaimus spp	rougorica	2006/2007	Pajović, Quintanilla, Bird	
Enoplida spp	Podgorica	1988	Jovičić, Stamenković	
Eucephalobus spp	Podgorica	2006/2007	Pajović, Quintanilla, Bird	
Eucephalobus oxyuroides	Podgorica	2006/2007	Pajović, Quintanilla, Bird	
Gracilacus spp	Podgorica	2006/2007	Pajović, Quintanilla, Bird	
Helicotylenchus spp	Podgorica	1988	Jovičić, Stamenković	
		2010	Pajović	
Helicotylenchus				
pseudorobustus (Steiner,	Podgorica	2010	Pajović	
1914) Golden, 1956				
Helicotylenchus				
platyurus Perry in Perry,	Podgorica	2010	Pajović	
Darling & Thorne, 1959		1000		
Hoplolaimus spp	Podgorica	1988	Jovičić, Stamenković	
Longidorus spp	Podgorica	1988	Jovičić, Stamenković	
Meloidogyne spp	Sutomore, Bar	1988	Jovičić, Stamenković	
	Podgorica	2010	Pajović	
Meloidogyne hapla Chitwood, 1949	Podgorica	2006/2007	Pajović, Urek, Širca	
Meloidogyne incognita (Kofoid & White, 1919)	Podgorica	2007	Pajović, Urek, Širca	

Chitwood, 1949			
Meloidogyne javanica (Treub, 1885) Chitwood, 1949	Podgorica	2007	Pajović, Urek, Širca
Meloidogyne arenaria (Neal, 1889) Chitwood, 1949	Podgorica	2007	Pajović, Urek, Širca
Meloidogyne ardenensis de Santos, 1968	Podgorica	2006/2007	Pajović, Urek, Širca
Mesodorylaimus spp	Podgorica	2006/2007	Pajović, Quintanilla, Bird
Mononchus spp	Podgorica	1988	Jovičić, Stamenković
Panagrellus spp	Podgorica	2006/2007	Pajović, Quintanilla, Bird
Plectus spp	Podgorica	2006/2007	Pajović, Quintanilla, Bird
Plectus tenuis	Podgorica	2006/2007	Pajović, Quintanilla, Bird
Poikilolaimus oxycerca	Podgorica	2006/2007	Pajović, Quintanilla, Bird
Pratylenchus spp	Podgorica	1988	Jovičić, Stamenković
Pratylenchus neglectus (Rensch, 1924) Filipjev & Schuu. Stek., 1941	Podgorica	2010	Pajović
Rhabditis spp	Podgorica	1988 2006/2007	Jovičić, Stamenković Pajović, Quintanilla, Bird
Rotylenchulus spp	Podgorica	2006/2007	Pajović, Quintanilla, Bird
Rotylenchulus macrodoratus Dasgupta, Raski & Sher, 1968	Podgorica	2010	Pajović
Tylenchorhynchus spp	Podgorica	1988	Jovičić, Stamenković
Tylenchus spp	Podgorica	1988	Jovičić, Stamenković

Based on the results of these findings, plans are underway to facilitate accurate nematode problem identification, the use of nematode-free transplants, the proper use of resistant varieties, nematocides, and the enhancement of the overall soil quality in greenhouse environments. On-farm research, nematode management demonstrations, and on-farm education programs must be used in these initiatives.

### - On Agrumes/Citrus Fruits-

Intensive production of fruits is less important than production of other plants in Montenegro. In 2008, some 11,885 hectares were under different types of orchards (SYM, 2009). The majority of them use an extensive production system, not intended for market, mainly for the home-made production of natural brandies. There is no data about nematodes or problems connected with them in these types of orchards. We still have no data dealing with nematosis in strawberry production, but with regard to tangerine and orange production, data

do exist. In 2008, there were 390,585 citrus trees in Montenegro, and several nematodes cases were reported in these orchards, as is presented in Table 4.

Table 4. Nematodes in orange and tangerine orchards in Montenegro until 2012.

Nematodes	Location	Year	Reporter/s
Oxydirus oxycephaloides DeMan, 1921	Meljine	1968	Krnjajić
Tylenchulus semipenetrans Cobb 1914	Ulcinj	1988	Vučinić & Tiodorović

#### - Forests and Forest Nurseries-

There are no data about nematodes in the forests or forest nurseries in Montenegro. However, in the light of the Commission Decision 2006/133/EC connected with possible appearance of *Bursaphelenchus xylophilus* (Steiner et Buhrer) Nickle et al we are working to begin monitoring *Pinus* forests, as well as taking other steps in accordance with the Directive.

It is important to note that some 627,000 hectares in Montenegro are covered by forests. Forests susceptible to *B. xylophilus* can be pure stands of conifers - 58,000 ha; mixed stands of conifers - 45,000 ha and mixed stands of deciduous trees and conifers 93,000 ha (SYM, 2009).

Some other nematodes, in terms of risk from B. xylophilus, pose a significant risk for the forests in Montenegro. As of 2012, several nematode cases have been reported in the forests of Montenegro (Table 5.).

Table 5. Nematodes found in forests in Montenegro as of 2012.

Nematodes	Location	Year	Herb species	Reporter/s
Xiphinema variurum Barsi & Lamberti, 1998	Crkvine	1998	Oak tree	Barsi
Xiphinema montenegrinum Barsi, Lamberti & Agostinelli, 1998	Morinj	1998	wood	Barsi
Xiphinema illyricum Barsi & Lamberti, 1999	Danilovgrad	1999	Carpinus orientalis	Barsi
Longidorus intermedius Kozlowska and Seinhorst, 1979	Žabljak	2001	Abies alba	Barsi
Longidorus piceicola Liskova et al., 1997	Budva, Lazi	2004	Quercus sp	Barsi

#### - On Flowers, Meadows, Pastures and Weeds-

Nematosis on flowers, meadows, pastures and weeds can be considered the least significant of Montenegro's plant production. We do not have any data for flower production in Montenegro as it is very small. However, there are some 127,853 ha of meadows and 324,269 ha of pastures (SYM, 2009). Several taxa of nematodes have been recorded in Montenegro on these plants (Table 6.).

Table 6. Nematodes found on flowers, meadows, and other wild plants in

Montenegro as of 2012.

Nematodes	Location	Year	Herb spec.	Reporter/s
Heterodera spp	Ulcinj	1988	Gladiola bulbs	Dimitrijević, Ivezić
Hoplolaimus spp	Ulcinj	1988	Gladiola bulbs	Dimitrijević, Ivezić
Meloidogyne spp	H. Novi, Petrovac	1988	Gladiola bulbs	Dimitrijević, Ivezić
Meloidogyne naasi Franklin, 1965	Ulcinj	1988	Gladiola bulbs	Dimitrijević, Ivezić
Meloidogyne arenaria (Neal, 1889) Chitwood, 1949	Ulcinj	1988	Gladiola bulbs	Dimitrijević, Ivezić
Rhabditis spp	Ulcinj	1988	Gladiola bulbs	Dimitrijević, Ivezić
Xiphinema simile Lamberti & al., 1983	Ulcinj	1994	P. aquilinum	Barsi
Xiphinema pachtaicum	Ulcinj	1994	P. aquilinum	Barsi
(Tulaganov, 1938)	Lazi,	2002	Grassland	Barsi and Lamberti
Kirjanova, 1951	Morinj,			
	Petrovac			

A couple of sources have incomplete data (Table 7.), but they must be mentioned, as they are legitimately sourced and connected with plant nematode research.

Table 7. All other plant nematodes found in Montenegro as of 2012.

Nematode	Location	Year	Reporter/s	Herb spec.
Ditylenchus dipsaci	unknown	1985	Alphey T.J.W. at all	unknown
Heterodera achilleae	unknown	1985	Alphey T.J.W. at all	unknown
Macroposthonia annulata	Meljine	1968	Krnjajić	Pitosporum scienensis
Macroposthonia ferniae	Meljine	1968	Krnjajić	Hidrogenta hortensis
Meloidogyne spp	unknown	1985	Alphey T.J.W. at all	unknown
Meloidogyne hapla	unknown	1985	Alphey T.J.W. at all	unknown
Meloidogyne incognita	unknown	1985	Alphey T.J.W. at all	unknown
Meloidogyne javanica	unknown	1985	Alphey T.J.W. at all	unknown
Xiphinema index	Morinj	2000	Barsi and Lamberti	unknown

Table 8. Overview of all plant nematodes, parasitic and free living, found in

Montenegro as of 2012.

1 Aphelenchoides app Podgorica 2006/2007 Pajorich, Gurinanilla, Bird Greenho Aphelenchous spp Podgorica 2006/2007 Pajorich, Gurinanilla, Bird Greenho Chromodes spp Podgorica 2006/2007 Pajorich, Gurinanilla, Bird Greenho Gurinanilla, Bird Greenho Chromodes spp Podgorica 2006/2007 Pajorich, Gurinanilla, Bird Greenho Diphlenchus spp Podgorica 2006/2007 Pajorich, Gurinanilla, Bird Greenho Diphlenchus arryceiophagus Ulcini 1988 Dimitriperich, Vesüc Polato in Diphlenchus arryceiophagus Pijedia 1985 Dimitriperich, Vesüc Polato in Diphlenchus spp Podgorica 2006/2007 Pajorich, Gurinanilla, Bird Greenho Diphlenchus spp Podgorica 2006/2007 Pajorich, Gurinani	ع	gro as of 2012.				
1 Aphelenchoides spp Podgorica 2006/2007   Aphelenchus spp Piedia   1985   Dimitrijeck, Vesiz   Potato fi Aphelenchus spp Podgorica   1988   Dimitrijeck, Vesiz   Creenho   1988   Aphelenchus spp Podgorica   1988   Dimitrijeck, Vesiz   Creenho   1988   Acrobe lockles spp Podgorica   1988   Dimitrijeck, Vesiz   Creenho   1988   Acrobe lockles spp Podgorica   1988   Dimitrijeck, Vesiz   Potato fi Creenho   1988   Aphelenchus spp Podgorica   1988   Aphelenchus spp Podgor					Authors/Reporters	Herb. Species
2 Aphelenchus app Pedgorica 1985 Dimitrijavić, kepič Greenho Aphelenchus app Pedgorica 1985 Jovičć, Stamenšović Greenho Accolhitos 1989 Pedgorica 2006/2079 Aphelenchus pp Pedgorica 2006/2079						Potato field
2 Aphelenchus app Podgonica 1988 Jovidé, Stamentović Greenho Sancoblobudes page Podgonica 1988 Jovidé, Cumantalia, Bird Greenho School Control Commonder app Podgonica 1985 Commonder app Podgonica 1985 Jovidé, Stamentović Greenho Control Commonder app Podgonica 1985 Jovidé, Stamentović Greenho Control Commonder app Podgonica 2006/2007 Fajović, Guinfanilia, Bird Greenho Control Commonder app Podgonica 2006/2007 Fajović, Guinfanilia, Bird Greenho Control Commonder app Podgonica 2006/2007 Fajović, Guinfanilia, Bird Greenho Podgonica 1980 Jovidé, Stamentović Greenho I Ophelenchus app Podgonica 1985 Dimitrijević, Nezić Podato in Ophelenchus app Podgonica 1988 Dimitrijević, Nezić Podato in Ophelenchus app Podgonica 1988 Dimitrijević, Nezić Podato in Ophelenchus app Podgonica 2006/2007 Pajović, Guinfanilia, Bird Greenho I Ecophelobus apyrudece Podgonica 2006/2007 Pajović, Guinfanilia, Bird Greenho I Ecophelobus apyrudece Podgonica 2006/2007 Pajović, Guinfanilia, Bird Greenho I Ecophelobus apyrudece Podgonica 2006/2007 Pajović, Guinfanilia, Bird Greenho I Ecophelobus apyrudece Podgonica 2006/2007 Pajović, Guinfanilia, Bird Greenho I Ecophelobus apyrudece Podgonica 2006/2007 Pajović, Guinfanilia, Bird Greenho I Ecophelobus apyrudece Podgonica 2006/2007 Pajović, Guinfanilia, Bird Greenho I Ecophelobus apyrudece Podgonica 2006/2007 Pajović, Guinfanilia, Bird Greenho I Ecophelobus apyrudece Podgonica 2006/2007 Pajović, Guinfanilia, Bird Greenho I Ecophelobus apyrudece Podgonica 2006/2007 Pajović, Guinfanilia, Bird Greenho I Pajović, Pajović, Guinfan						Greenhouse
3 Acrobolus spp Podgorica 2006/2007 Pajowic Quintantial, Bird Greenho Concentration of the Co						Potato field
4 Acrobeloides app Podgorica 2006/2007 Pajović, Quinfamilia, Bird Greenho S Ortocomenoides app Piedgorica 2006/2007 Pajović, Quinfamilia, Bird Greenho Control of Con	2 /	Aphelenchus spp		1000		
5 Circonemoides app Pijerija 1985 Dimitrijević, kezić Greenio Scrocenomoides app Podgorica 2006/207 Pajović, Galmeniović Greenio Scrocenomoides app Podgorica 2006/207 Pajović, Guinfanilia, Bird Greenio Politylinohus app Podgorica 1988 Dimitrijević, Vesić Podato fi 10 Dinferophora app Pijevija 1985 Dimitrijević, Vesić Podato fi 11 Dinferophora app Pijevija 1985 Dimitrijević, Vesić Podato fi 12 Dinferophora app Pijevija 1985 Dimitrijević, Vesić Podato fi 13 Dinferophora app Pijevija 1985 Dimitrijević, Vesić Podato fi 13 Dinferophora app Podgorica 1988 Dimitrijević, Vesić Podato fi 14 Dovylamius app Podgorica 1988 Dimitrijević, Vesić Podato fi 15 Enoplida app Podgorica 1988 Dimitrijević, Vesić Greenio Podgorica 2006/2007 Pajović, Guinfanilia, Bird Greenio Podg	3 /	Acrobilus spp				
5 Cicconemodes app Podgorica 1988 Joydéé, Stamenkové Greenho Cophalobus app Podgorica 2006/2007 Pajové, Guinfantilla, Bird Greenho Podgorica 1906/2007 Pajové, Guinfantilla, Bird Unitorio Podgorica 1906/2007 Pajové, Guinfantilla, Bird Greenho Podgorica 1906/2007 Pajové, Guinfantilla, Bi						
6 Cephalobus app Podgorica 2006/2007 Fajović, Cuinfanilla, Bird Greenho Greenh						
8 Cuticulara eypercaa Podgorica 2006/2007 Pajović, Cuntanilla, Bird Greenho Surjivenchus app Podgorica 1988 Jovićć, Statamenković Greenho Podgorica 1988 Jovičć, Statamenković Podato fi Greenho Podgorica 1988 Jovičć, Statamenković Podato fi Greenho Podgorica 1988 Jovičć, Statamenković Greenho Podgorica 1988 Jovičć, Statamenković Greenho Podgorica 2006/2007 Pajović, Cuntanilia, Bird Greenho Podgorica 2006/2		Control of the contro				
8 Cutcularia oxycerca Podgorica 2006/2007 Pajović, Cuintanilla, Bird Greenho 9 Ditylenchus app Podgorica 1988 Jovičić, Stamenković Greenho 19 Ditylenchus app Podgorica 1988 Jovičić, Stamenković Greenho 19 Ditylenchus appaca unxivovim 1982 Alphy T.J.W. at all unxivovim 1983 Ditylenchus intermedius 1984 Ditylenchus program 1984 Dovylamus app Podgorica 1988 Ditylenchus 1984 Ditylenchus 1984 Dovylamus app Podgorica 1988 Ditylenchus 1984 Ditylenchus 1985 Ditylenc	7/	Chiroplacus app				
9 Ditylenchus spp Pogostos 1988 Jovičić, Stamenković Greenho Pijevija 1985 Ditylenchus pp Pijevija 1985 Ditylenchus dipasaci unknown 1985 Alphey T.J.W. at all unknown 1985 Dimitrijević, Nezić Potato fi Doylaimus spp Pijevija 1985 Dimitrijević, Nezić Potato fi Doylaimus spp Pogostos 2006/2007 Pajović, Cuntantila, Bird Greenho 15 Enoglide spp Pogostos 2006/2007 Pajović, Cuntantila, Bird Greenho 15 Enoglide spp Podgorica 2006/2007 Pajović, Cuntantila, Bird Greenho 16 Eucephalobus oxyunides Podgorica 2006/2007 Pajović, Cuntantila, Bird Greenho 17 Eucephalobus oxyunides Podgorica 2006/2007 Pajović, Cuntantila, Bird Greenho 18 Gracilaecus spp Podgorica 2006/2007 Pajović, Cuntantila, Bird Greenho 19 Heterodera spp Ulcinj 1988 Dimitrijević, Nezić Gliadolat Elektrodera spp Pijevija 1988 Dimitrijević, Nezić Gliadolat Elektrodera spp Pijevija 1988 Dimitrijević, Nezić Potato fi Podgorica 2006/2007 Pajović, Cuntantila, Bird Greenho 1988 Dimitrijević, Nezić Potato fi Podgorica 2006/2007 Pajović, Cuntantila, Bird Greenho 1988 Dimitrijević, Nezić Potato fi Podgorica 2006/2007 Pajović, Cuntantila, Bird Greenho 2006/2007 Pajović, Cunt						
9 Difylenchus spp						
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11   Diphtenophora app		Ditylenchus spp			Alphay T. I.W. at all	
Topylenchus Intermedius						
13   Diylenchus myceliophagus   Ulon   1988   Dimitijević, Ivezić Potato fi   Doylaimus spp   Pigvija   1985   Dimitijević, Ivezić Potato fi   Potato fi   Doylaimus spp   Podgorica   1988   Jovičć, Stamenković   Potato fi   Engolida spp   Podgorica   2006/2007   Pajović, Cuntantila, Bird   Greenho fi   Eucephalobus oxyunides   Podgorica   2006/2007   Pajović, Cuntantila, Bird   Greenho fi   Eucephalobus oxyunides   Podgorica   2006/2007   Pajović, Cuntantila, Bird   Greenho fi   Eucephalobus oxyunides   Podgorica   2006/2007   Pajović, Cuntantila, Bird   Greenho fi   Eucephalobus oxyunides   Podgorica   2006/2007   Pajović, Cuntantila, Bird   Greenho fi   Eucephalobus oxyunides   Podgorica   2006/2007   Pajović, Cuntantila, Bird   Greenho fi   Podgorica   2006/2007   Pajović   Greenho fi   Pajović   Pajov						
14 Dov/aimus spp						Potato field
14 Doylaimus spp Podgorica 1988 Dowléi, Stamenković Greenho 15 Enoplida spp Podgorica 1988 Jowléi, Stamenković Greenho 17 Eucephalobus spp Podgorica 2008/2007 Pajović Quintanila, Bird Greenho 17 Eucephalobus oyuroides Podgorica 2008/2007 Pajović Quintanila, Bird Greenho 17 Eucephalobus oyuroides Podgorica 2008/2007 Pajović Quintanila, Bird Greenho 18 Dimitijević, Nezić Greenho 19 Heterodera spp Ulcinj 1988 Dimitijević, Nezić Greenho 1981 Dimitijević, Nezić Podgorica 21 Heterodera drifoli 19 Heterodera trifoli 19 Heterodera						Potato field
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Telegophalobus spp	14 /	Dorylaimus spp	Podgorica	2006/2007	Pajović, Quintanilla, Bird	Greennouse
17 Eucephalobus oxyuroides 18 Gracillous spp 19 Podgorica 19 Heterodera spp 19 Podgorica 19 Heterodera abrilleae 10 Hinterodera abrilleae 10 Hinterodera abrilleae 10 Hinterodera abrilleae 11 Heterodera abrilleae 12 Helerodylera brilleae 12 Helerodylera brilleae 13 Helerodylera brillea 14 Helerodylera brillea 15 Helerodylerachus psp 16 Podgorica 15 Helerodylerachus psp 16 Podgorica 16 Helerodylerachus psp 17 Podgorica 18 Helerodylerachus psp 18 Podgorica 18 Helerodylerachus psp 18 Podgorica 19 Helerodylerachus psp 19 Podgorica 19 Helerodylerachus psp 19 Podgorica 19 Helerodylerachus psp 19 Podgorica 1988 Jovičić, Stamenković Greenho 19 Helerodylerachus psp 19 Podgorica 1988 Jovičić, Stamenković Greenho 19 Helerodylerachus psp 19 Podgorica 1988 Jovičić, Stamenković Greenho 19 Doggorica 19 Helerodylerachus psp 19 Pljevlja 1985 Dimitrijević, Nezić Potato fi 19 Doggorica 19 Doggorica 1988 Jovičić, Stamenković Greenho 19 Doggorica 1988 Jovičić, Stamenković Greenho 19 Doggorica 1988 Jovičić, Stamenković 19 Doggorica 1988 Jovičić, Stamenković 19 Doggorica 1988 Dimitrijević, Nezić Potato fi 19 Doggorica 19 Doggorica 1988 Dimitrijević, Nezić Potato fi 19 Doggorica 1988 Dimitrijević, Nezić Gladiola t 19 Doggorica 19 Doggor	15 E	Enoplida spp	Podgorica	1988	Jovičić, Stamenković	Greenhouse
17 Eucephalobus oxyuroides Podgorica 2006/2007 Pajović, Quintanilla, Bird Greenho 19 Hoterodera spp Podgorica 2006/2007 Pajović, Quintanilla, Bird Greenho 19 Hoterodera schilleae unknown 1985 Alphyr J.W. at all unknown 198	16 E	Eucephalobus spp	Podgorica	2006/2007	Pajović, Quintanilla, Bird	Greenhouse
19   Heterodera spin    Uclin    1988   Dimitrijević, Nezić   Gladiola I	17 E	Eucephalobus oxyuroides			Pajović, Quintanilla, Bird	Greenhouse
20   Heterodera archilleae   unknown   1985   Alphey T.J.W. at all unknown   1986   Drimitijević, Nezić   Potato fi   22   Helicotylenchus spp   Pijevija   1985   Drimitijević, Nezić   Potato fi   22   Helicotylenchus spp   Podgorica   1988   Jovičić, Stamenković   Greenho   24   Pelicotylenchus pseudorobustus   Podgorica   2010   Pajović   Greenho   25   Podlodimus spp   Podgorica   2010   Pajović   Greenho   25   Podlodimus spp   Podgorica   2010   Pajović   Greenho   25   Podlodimus spp   Podgorica   1988   Jovičić, Stamenković   Greenho   25   Podlodimus spp   Podgorica   1988   Jovičić, Stamenković   Greenho   26   Longidorus spp   Pijevija   1985   Drimitijević, Nezić   Potato fi   26   Longidorus spp   Podgorica   1988   Jovičić, Stamenković   Greenho   27   Longidorus piceicola   Zabljak   2001   Barsi   Abresa   28   Longidorus piceicola   Zabljak   2001   Barsi   Abresa   28   Longidorus piceicola   Zabljak   2001   Barsi   Abresa   28   Longidorus piceicola   28   Longidorus piceicola   28   Longidorus piceicola   28   Longidorus piceicola   29   Mononchus spp   Pijevija   1985   Drimitijević, Nezić   Potato fi   Podgorica   2010   Barsi   Abresa   29   Longidorus piceicola   29   Longidorus piceicola   20   Longidorus   20	18 (	Gracilacus spp				Greenhouse
20   Heterodera atrifoli   Pijevija   1985   Dimitrijević, kražić   Potato fi   22   Helicotylenchus spp   Pijevija   1985   Dimitrijević, kražić   Potato fi   22   Helicotylenchus spp   Pijevija   1985   Dimitrijević, kražić   Potato fi   23   Helicotylenchus spp   Podgorica   2010   Pajović   Greenho   24   Helicotylenchus pseudorobustus   Podgorica   2010   Pajović   Greenho   25   Hoplolaimus spp   Podgorica   2010   Pajović   Greenho   25   Hoplolaimus spp   Podgorica   2010   Pajović   Greenho   25   Hoplolaimus spp   Podgorica   1988   Jovičić, Stamenković   Greenho   25   Hoplolaimus spp   Podgorica   1988   Jovičić, Stamenković   Greenho   26   Longidorus spp   Pijevija   1985   Dimitrijević, kvažić   Potato fi   26   Longidorus precicola   Zabljak   2001   Barai   Abrea a   27   Longidorus precicola   Zabljak   2001   Barai   Abrea a   28   Longidorus precicola   Zabljak   2001   Barai   Abrea a   28   Longidorus precicola   Zabljak   2001   Barai   Abrea a   29   Longidorus precicola   28   Longidorus precicola   29   Longidorus precicola   20   Longidorus precicola   20   Longidorus precicola   20   Longidorus precicola   20   Longidorus   20   Longido			Ulcinj	1988	Dimitrijević, Ivezić	Gladiola bulbs
22 Helicotylenchus spp	20 /	leterodera achilleae			Alphey T.J.W. at all	unknown
22 Helicotylenchus spp			Pljevlja			Potato field
Pelicotylenchus spp					Dimitrijević, Ivezić	Potato field
### ### ### ### ### ### ### ### ### ##	-		Podgorica			Greenhouse
24 Helicotylenchus platyurus   Podgorica   2910   Pajowć Greenho   25 Hoplolalimus spp   Podgorica   1988   Jovičić, Stamenković Greenho   26 Longidorus spp   Ulcin   1988   Dimitrijević, Ivezić Gidalola   26 Longidorus spp   Podgorica   1988   Dimitrijević, Ivezić Gidalola   26 Longidorus piceicola   23 blajak   2001   Barsi   Abies al   2002   2004   20	_		_			
25 Hoplolaimus spp	_					Greenhouse
25   Hojolalaimus spp		Helicotylenchus platyurus				Greenhouse
Pelevija   Pelevija   Podgorica   1985   Dimitrijević, Nezić Greenho   Podgorica   1988   Jovičić, Stamenković Greenho   Podgorica   1988   Jovičić, Stamenković Greenho   Podgorica   P	25 <i>l</i>	Hoplolaimus spp				Greenhouse
22   Longidorus piceicola   Zabljak   2001   Barsi   Abiesa   28   Longidorus intermedius   Budva, Lazi   2004   Barsi   Abiesa   28   Longidorus intermedius   Budva, Lazi   2004   Barsi   Abiesa   28   Mononchus spp   Pijevija   1985   Dimitrijević, kezić   Potato fi o Meloidogyne spp   Kotor   1975   Gavrilo Grujičić   Spinat   Sp	25 <i>l</i>	Hoplolaimus spp				Gladiola bulbs
Zel Longidorus intermedius   Zabijak   2004   Barsi   Ables al   28 Longidorus intermedius   Budva. Lazi   2004   Barsi   Quercus   29 Monanchus spp   Pijevija   1985   Dimitrijević, Vezić   Potato fi   30 Meloidogyne spp   Kotor   1975   Gavino Grujićić   Spinara   30 Meloidogyne spp   Kotor   1975   Gavino Grujićić   Spinara   30 Meloidogyne spp   H. Novi, Petrovac   1988   Jovičić, Stamenković   Greenho   30 Meloidogyne spp   H. Novi, Petrovac   1988   Dimitrijević, Vezić   Galdiola to Meloidogyne spp   Unknown   1985   Alphey T.J.W. at all   Unknown   19						Potato field
28   Longidorus intermedius		Longidorus spp				Greenhouse
Polygonica   1985   Dimitrijević, Nezić   Potato fi   30 Meloidogyne spp   Sutomore, Bar   1988   Jovičić, Stamenković   Spinata   30 Meloidogyne spp   H. Novi, Petrovac   1988   Dimitrijević, Nezić   Greenho   30 Meloidogyne spp   H. Novi, Petrovac   1988   Dimitrijević, Nezić   Galdiola to   30 Meloidogyne spp   H. Novi, Petrovac   1988   Dimitrijević, Nezić   Galdiola to   30 Meloidogyne arenaria   Ulcinj   1988   Dimitrijević, Nezić   Galdiola to   31 Meloidogyne arenaria   Podgorica   2007   Pajović, Urek, Širca   Greenho   33 Meloidogyne arenaria   Podgorica   2007   Pajović, Urek, Širca   Greenho   33 Meloidogyne hapla   Unknown   1985   Alphey T.J.W. at all Unknown   34 Meloidogyne incognita   Podgorica   2006/2007   Pajović, Urek, Širca   Greenho   34 Meloidogyne incognita   Unknown   1985   Alphey T.J.W. at all Unknown   34 Meloidogyne incognita   Unknown   1985   Alphey T.J.W. at all Unknown   34 Meloidogyne incognita   Unknown   1985   Alphey T.J.W. at all Unknown   35 Meloidogyne javanica   Podgorica   2006/2007   Pajović, Urek, Širca   Greenho   35 Meloidogyne javanica   Unknown   1985   Alphey T.J.W. at all Unknown   36 Meloidogyne javanica   Unknown   1985   Alphey T.J.W. at all Unknown   36 Meloidogyne javanica   Podgorica   2006/2007   Pajović, Urek, Širca   Greenho   36 Meloidogyne adrenensis   Podgorica   2006/2007   Pajović, Urek, Širca   Greenho   37 Mesodonylaimus spp   Podgorica   2006/2007   Pajović, Urek, Širca   Greenho   37 Mesodonylaimus spp   Podgorica   2006/2007   Pajović, Urek, Širca   Greenho   38 Monoroposthonia annulata   Meljine   1968   Krnjajić   Pitosporum sc   Podgorica   2006/2007   Pajović, Cuntantilla, Bird   Podgorica   2006/2007   Pajo		Longidorus piceicola				Abies alba
Meloidogyne spp   Sutomore, Bar   1975   Gavrilo Grujičić   Spinat		Longidorus intermedius				Quercus sp
Sutomore, Bar   1988   Jovičić, Stamenković   Greenho   2010   Pajović   Greenho   2010   Pajović   Greenho   2010   Pajović   Greenho   2010   Pajović, vezić   Gladiola t   2010   Pajović, vezić   Greenho   2006/2007   Pajović, vezić   Pitosporum se   2006/2007   Pajović, vezić   Potatof   2006/20						Potato field
30 Meloidogyne spp Podgorica 2010 Pajović Greenho Meloidogyne spp Unknown 1985 Alphey T.J.W. at all Unknown 1985 Dimitrijević, kezić Gladiola t 2007 Pajović, Urek, širca Greenho 1986 Dimitrijević, kezić Gladiola t 1988 Dimitrijević, kezić Greenho 1985 Alphey T.J.W. at all Unknown 1985 Alphey D.J.W. at	30 /	Meloidogyne spp				Spinach
Podgorica   2010   Pajović   Gladiola t	30 /	Meloidogyne spp				Greenhouse
30 Meloidogyne spp  1 Meloidogyne areasis  Uicinj  1 Meloidogyne arenaria  2 Meloidogyne arenaria  3 Meloidogyne arenaria  Podgorica  2 2007 Pajowč, Urek, Širca  Greenho  3 Meloidogyne incognita  Podgorica  2 2007 Pajowč, Urek, Širca  Greenho  Meloidogyne incognita  Podgorica  2 2007 Pajowč, Urek, Širca  Greenho  Meloidogyne incognita  Podgorica  2 2007 Pajowč, Urek, Širca  Greenho  Meloidogyne incognita  Podgorica  2 2007 Pajowč, Urek, Širca  Greenho  Meloidogyne javanica  Podgorica  2 2007 Pajowč, Urek, Širca  Greenho  Meloidogyne javanica  Podgorica  2 2007 Pajowč, Urek, Širca  Greenho  Meloidogyne javanica  Podgorica  2 2007 Pajowč, Urek, Širca  Greenho  Meloidogyne javanica  Podgorica  2 2006/2007 Pajowč, Urek, Širca  Greenho  Meloidogyne javanica  Podgorica  2 2006/2007 Pajowč, Urek, Širca  Greenho  Meloidogyne javanica  Podgorica  2 2006/2007 Pajowč, Urek, Širca  Greenho  Meloidogyne areanica  Meloidogyne javanica  Podgorica  2 2006/2007 Pajowč, Cuintanilla, Bird Greenho  Meroposthonia annulata  Meljine  1 958  Krnjajič  Hidrogenta h  Meljine  1 958  Krnjajič  Hidrogenta h  Vineyar  4 Oxydirus oxycephalus  Meljine  1 958  Krnjajić  Vineyar  4 Oxydirus oxycephalus  Meljine  1 958  Meloidogyne  Mel	20 1	Mataida			Pajovic	Cladiala bulba
31 Meloidogyne arenaria Ulcinj 1988 Dimitrijević, kvezić Gladiola t 22 Meloidogyne arenaria Ulcinj 1988 Dimitrijević, kvezić Gladiola t 22 Meloidogyne arenaria Podgorica 2007 Pajović, Urek, Širca Greenho unknown 1985 Alphey T.J.W. at all unknow					Alphov T. LW, et all	
32 Meloidogyne arenaria Podgorica 2007 Pajović, Urek, Širca Greenho 33 Meloidogyne hapla unknown 1985 Alphey T.J.W. at all unknown 1985 Alphey T.J.W. at all unknown 1985 Alphey T.J.W. at all unknown 33 Meloidogyne hapla Podgorica 2006/2007 Pajović, Urek, Širca Greenho 34 Meloidogyne incognita Podgorica 2007 Pajović, Urek, Širca Greenho 34 Meloidogyne incognita unknown 1985 Alphey T.J.W. at all unknown 1985 Alph		vieloldogyne spp			Alphey 1.J.W. at all	
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33 Meloidogyne hapla Podgorica 2006/2007 Pajowć, Urek, Širca Greenho Al Meloidogyne incognita Podgorica Podgorica 2007 Pajowć, Urek, Širca Greenho Al Meloidogyne incognita Unknown 1985 Alphey T.J.W. at all Unknown 1986 Krnjajc 1988 Krnjajc 1988 Krnjajc 1989 Krnjajc 1989 Krnjajc 1989 Krnjajc 1989 Krnjajc 1989 Krnjajc 1989 Dimitrijevic, vezić 1980 Podgorica 1988 Jowićić, Stamenkowić 1990 Greenho 1990 Podgorica 1990 Dimitrijevic, vezić 1900 Potato fi 1990 Podgorica 19						
Podgorica   2006/2007   Pajowć, Urek, Širca   Greenho   Al Meloidogyne incognita   Podgorica   2007   Pajowć, Urek, Širca   Greenho   Al Meloidogyne incognita   Unknown   1985   Alphey T.J.W. at all   Unknown   1986   Krnjajić   Plotogoria   1986   Krnjajić   Plotogoria   1988   Krnjajić   Vineyar   1985   Dimitrijević, Ivezić   Potato fi   1007					Pajovic, Orek, Sirca	
34 Meloidogyne incognita   Podgorica   2007   Pajowć, Urek, Širca   Greenho   34 Meloidogyne javanica   Unknown   1985   Alphey T.J.W. at all   Unknown   35 Meloidogyne javanica   Unknown   1985   Alphey T.J.W. at all   Unknown   36 Meloidogyne javanica   Unknown   1985   Alphey T.J.W. at all   Unknown   36 Meloidogyne avanica   Unknown   1985   Alphey T.J.W. at all   Unknown   36 Meloidogyne avanica   Unknown   1985   Alphey T.J.W. at all   Unknown   36 Meloidogyne avanica   Unknown   1985   Alphey T.J.W. at all   Unknown   37 Mesodorylearius spp   Podgorica   2006/2007   Pajowć, Cuintanilla, Bird   Greenho   38 Menonchus spp   Podgorica   1988   Jováčić, Stamenković   Greenho   39 Macroposthonia annulata   Meljine   1988   Krnjajić   Pitosporum sc   40 Macroposthonia annulata   Meljine   1988   Krnjajić   Pitosporum sc   41 Oxydirus oxycephalus   Meljine   1988   Krnjajić   Vineyar   41 Oxydirus oxycephalus   Meljine   1988   Krnjajić   Vineyar   41 Oxydirus oxycephalus   Meljine   1988   Krnjajić   Citrust   42 Paratylenchus spp   Pijevlja   1985   Dimitrijević, kezić   Potato fi   42 Pratylenchus spp   Podgorica   1988   Jováčić, Stamenković   Greenho   43 Pratylenchus spp   Podgorica   2010   Pajović   Greenho   47 Pitospendus   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   48 Painenchus spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   48 Painenchus spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   49 Rhabditis spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   49 Rhabditis spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   49 Rhabditis spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   49 Rhabditis spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   49 Rhabditis spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   49 Rhabditis spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   49 Rhabditis spp   Podgorica   2006/2007   Pajović, Stamenković   Green	33 /	vieloldogyne napia			Alphey 1.J.W. at all	
34 Meloidogyne incognita   unknown   1985   Alphey T.J.W. at all   unknown   1986   Meloidogyne javanica   Podgorica   2007   Pajović, Urek, Sirca   Greenho   35 Meloidogyne javanica   unknown   1985   Alphey T.J.W. at all   unknown   1986   Alphey T.J.W. at all   unknown   1988   Al						
Same						
35 Meloidogyne javanica   unknown   1985   Alphey T.J.W. at all   unknown   1986   Meloidogyne ardenensis   Podgorica   2006/2007   Pajović, Urek, Sirca   Greenho   37 Mesodorylaimus spp   Podgorica   2006/2007   Pajović, Urek, Sirca   Greenho   38 Mononchus spp   Podgorica   1988   Jovičić, Stamenković   Greenho   39 Mecroposthonia annulata   Meljine   1988   Krnjajić   Pitosporum sc   40 Mecroposthonia ferniae   Meljine   1988   Krnjajić   Pitosporum sc   41 Oxydirus oxycephalus   Meljine   1988   Krnjajić   Vineyar   141 Oxydirus oxycephalus   Meljine   1988   Krnjajić   Vineyar   141 Oxydirus oxycephalus   Meljine   1988   Krnjajić   Vineyar   142 Pratylenchus spp   Pijevlja   1985   Dimitrijević, Ivezić   Potato fi   142 Pratylenchus spp   Pijevlja   1985   Dimitrijević, Ivezić   Potato fi   142 Pratylenchus spp   Podgorica   1988   Jovičić, Stamenković   Greenho   143 Pratylenchus spp   Podgorica   2010   Pajović   Greenho   144 Psilenchus spp   Podgorica   2010   Pajović   Greenho   145 Panagrellus spp   Podgorica   2006/2007   Pajović, Ouintanilla, Bird   Greenho   147 Plectus tenuis   Podgorica   2006/2007   Pajović, Ouintanilla, Bird   Greenho   148 Polikilolaimus oxycerca   Podgorica   2006/2007   Pajović, Ouintanilla, Bird   Greenho   149 Rhabditis spp   Podgorica   2006/2007   Pajović, Ouintanilla, Bird   Greenho   149 Rhabditis spp   Podgorica   2006/2007   Pajović, Ouintanilla, Bird   Greenho   140 Rhabditis spp   Podgorica   2006/2007   Pajović, Ouintanilla, Bird   Greenho   140 Rhabditis spp   Podgorica   2006/2007   Pajović, Ouintanilla, Bird   Greenho   140 Rhabditis spp   Podgorica   2006/2007   Pajović, Ouintanilla, Bird   Greenho   140 Rhabditis spp   Pijevlja   1985   Dimitrijević, Ivezić   Greenho   140 Rhabditis spp   Pijevlja   1985   Dimitrijević, Ivezić   Potato fi   140 Rhabditis spp   Pijevlja   1985   Dimitrijević, Ivezić   Potato fi   140 Rhabditis spp   Pijevlja   1985   Dimitrijević, Ivezić   Potato fi   140 Rhabditis spp   Pijevlja   1985   Dimitrijević, Ivezić   Potato fi						
36 Meloidogyne ardenensis   Podgorica   2006/2007   Pajowić, Urak, Širca   Greenho   37 Mesodorylaimus spp   Podgorica   2006/2007   Pajowić, Cularilla, Bird   Greenho   38 Macroposthonia annulata   Meljine   1988   Krnjajić   Pitosporum scholarilla, Bird   Oxydirus oxycephalus   Meljine   1968   Krnjajić   Citrust   42 Paratylenchus spp   Pijevija   1985   Dimitrijević, Ivezić   Potato fitosporum scholarilla, Bird   Pitosporum		vierordogyne javanica				
37   Mesodon/laimus spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   39   Macroposthonia annulata   Meljine   1988   Krnjajić   Pitosporum sc.   40   Macroposthonia ferniae   Meljine   1988   Krnjajić   Pitosporum sc.   41   Oxydirus oxycephalus   Meljine   1988   Krnjajić   Pitosporum sc.   41   Oxydirus oxycephalus   Meljine   1988   Krnjajić   Vineyar   41   Oxydirus oxycephalus   Meljine   1988   Krnjajić   Vineyar   41   Oxydirus oxycephalus   Meljine   1988   Krnjajić   Vineyar   42   Paratylenchus spp   Pijevlja   1985   Dimitrijević, vezić   Potato fi   42   Pratylenchus spp   Pijevlja   1985   Dimitrijević, vezić   Potato fi   42   Pratylenchus spp   Podgorica   1988   Oxidić, Stamenković   Greenho   43   Pratylenchus spp   Podgorica   2010   Pajović   Greenho   45   Panagrellus spp   Pijevlja   1985   Dimitrijević, vezić   Potato fi   45   Panagrellus spp   Podgorica   2010   Pajović   Greenho   45   Panagrellus spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   46   Piectus spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   47   Piectus tenuis   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   47   Piectus tenuis   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   47   Piectus tenuis   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   48   Pahabditis spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   49   Rhabditis spp   Pijevlja   1985   Dimitrijević, vezić   Gladiola to   1988   Dimitrijević, vezić   Potato fi   1980   Dimitrijević, vezić   Potato fi   1980   Dimitrijević, vezić   Potato fi   1980   Dimitrijević, vezić   Potato fi   1994   1995   Dimitrij		Meloidogyne javanica				
38   Mononchus spp   Podgorica   1988   Joxičić, Stamenković   Greenho   Macroposthonia annulata   Meljine   1988   Krnjajić   Pitosporum scholara   Meljine   1988   Krnjajić   Pitosporum scholara   Meljine   1988   Krnjajić   Pitosporum scholara   Meljine   1988   Krnjajić   Vineyar   Meljine   1988   Krnjajić   Vineyar						
Macroposthonia annulata   Meljine   1968   Krnjajić   Pitosporum st						
Macroposthonia ferniae   Meljine   1988   Krnjajić   Midrogentah   10 yydirus oxycephalus   Meljine   1968   Krnjajić   Vineyar   141   Oxydirus oxycephalus   Meljine   1968   Krnjajić   Vineyar   142   Paratylenchus spp   Pijevlja   1985   Dimitrijević, Nezić   Potato fi   142   Pratylenchus spp   Pijevlja   1985   Dimitrijević, Nezić   Potato fi   142   Pratylenchus spp   Pijevlja   1985   Dimitrijević, Nezić   Potato fi   142   Pratylenchus spp   Podgorica   1988   Jovičić, Stamenković   Greenho   143   Pratylenchus spp   Podgorica   2010   Pajović   Greenho   144   Pzilenchus spp   Podgorica   2010   Pajović   Greenho   144   Pzilenchus spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   145   Panagrellus spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   146   Polikilolaimus oxycerca   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   147   Piectus tenuis   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   148   Polikilolaimus oxycerca   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   148   Polikilolaimus oxycerca   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   149   Rhabditis spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   140   Palović, Quintanilla, Bird   Greenho   140   Palović, Quintanilla, Bird   Greenho   140   Palović, Podgorica   2006/2007   Pajović, Quintanilla, Bird   G						
41 Oxydirus oxycephalus   Meljine   1988   Krnjajić   Vineyar   41 Oxydirus oxycephalus   Meljine   1988   Krnjajić   Citrust   42 Prartylenchus spp   Pijevlja   1985   Dimitrijević, kezić   Potato fi   42 Pratylenchus spp   Pijevlja   1985   Dimitrijević, kezić   Potato fi   42 Pratylenchus spp   Podgorica   1988   Jovičić, Stamenković   Greenho   43 Pratylenchus neglectus   Podgorica   2010   Pajović   Greenho   43 Pratylenchus spp   Pijevlja   1985   Dimitrijević, kezić   Potato fi   44 Psilenchus spp   Podgorica   2000   Pajović   Greenho   45 Panagrellus spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   46 Piectus spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   47 Piectus tenuis   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   48 Poikilolaimus oxycerca   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   49 Rhabditis spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   49 Rhabditis spp   Ulcinj   1988   Dimitrijević, kezić   Gladiola to   50 Rotylenchus spp   Pijevlja   1985   Dimitrijević, kezić   Potato fi   51 Rotylenchulus spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   51 Rotylenchulus spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   52 Rotylenchulus spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   53 Trichodorus spp   Podgorica   2006/2007   Pajović, Cuintanilla, Bird   54 Tylenchorhynchus spp   Podgorica   2006/2007   Pajović, Cuintanilla, Bird   55 Trichodorus spp   Podgorica   2006/2007   Pajović, Cuintanilla, Bird   56 Tylenchulus spp   Podgorica   2006/2007   Pajović, Cuintanilla, Bird   56 Tylenchulus spp   Podgorica   2006/2007   Pajović, Cuintanilla, Bird   57 Tylenchulus spp   Podgorica   2006/2007   Pajović, Cuintanilla, Bird   58 Tylenchorhynchus spp   Podgorica   2006/2007   Pajović   Cuintanilla, Bird   59 Tylenchorhynchus spp   Podgorica   2006/2007   Pajović   Cuintanilla, Bird   59 Tylenchus semipenetrans   Ulcinj   1988   Dimitrijević, kezić   Potato fi   59 Tylenchus						
Autopart						
42 Pratylenchus spp Pijevija 1985 Dimitrijević, kvezić Potato fi  42 Pratylenchus spp Pijevija 1985 Dimitrijević, kvezić Potato fi  43 Pratylenchus spp Podgorica 1988 Jovičić, Stamenković Greenho  44 Pratylenchus spp Podgorica 2010 Pajović, Culintanilia, Bird Greenho  45 Pratylenchus spp Podgorica 2006/2007 Pajović, Culintanilia, Bird Greenho  46 Piectus spp Podgorica 2006/2007 Pajović, Culintanilia, Bird Greenho  47 Piectus tenuis Podgorica 2006/2007 Pajović, Culintanilia, Bird Greenho  48 Poikilolaimus oxycerca Podgorica 2006/2007 Pajović, Culintanilia, Bird Greenho  48 Poikilolaimus oxycerca Podgorica 2006/2007 Pajović, Culintanilia, Bird Greenho  48 Pokabditis spp Podgorica 2006/2007 Pajović, Culintanilia, Bird Greenho  49 Rhabditis spp Podgorica 2006/2007 Pajović, Culintanilia, Bird  50 Rotylenchus spp Pijevija 1988 Dimitrijević, kvezić Gladiola to  50 Rotylenchulus spp Pijevija 1985 Dimitrijević, kvezić Potato fi  51 Rotylenchulus spp Podgorica 2006/2007 Pajović, Culintanilia, Bird  52 Rotylenchulus macrodoratus Podgorica 2006/2007 Pajović, Culintanilia, Bird  53 Trichodorus spp Pijevija 1985 Dimitrijević, kvezić Potato fi  54 Tylenchorhynchus spp Pijevija 1985 Dimitrijević, kvezić Potato fi  54 Tylenchorhynchus spp Pijevija 1985 Dimitrijević, kvezić Potato fi  55 Tylenchus semipenetrans Ulcinj 1988 Jovičić, Stamenković Greenho  55 Tylenchus semipenetrans Ulcinj 1988 Jovičić, Stamenković Greenho  55 Tylenchus spp Pijevija 1985 Dimitrijević, kvezić Potato fi  56 Tylenchus spp Pijevija 1985 Dimitrijević, kvezić Potato fi  57 Tylenchus spp Pijevija 1985 Dimitrijević, kvezić Potato fi  58 Tylenchus spp Pijevija 1985 Dimitrijević, kvezić Potato fi  57 Tylenchus spp Pijevija 1985 Dimitrijević, kvezić Potato fi  58 Tylenchus spp Pijevija 1985 Dimitrijević, kvezić Potato fi  58 Tylenchus spp Pijevija 1985 Dimitrijević, kvezić Potato fi  59 Tylenchus spp Pijevija 1985 Dimitrijević, kvezić Potato fi  59 Tylenchus spp Pijevija 1985 Dimitrijević, kvezić Potato fi  59 Tylenchus spp Pijevija 1985 Dimitrijević, kvezić P						
42 Pratylenchus spp Podgorica 1985 Dimitrijević, Nezić Greenho 43 Pratylenchus spp Podgorica 2010 Pajović Greenho 44 Pailenchus spp Podgorica 2010 Pajović Greenho 45 Pratylenchus neglectus Podgorica 2006/2007 Pajović, Nezić Potato fi Policitus spp Podgorica 2006/2007 Pajović, Ouintaniila, Bird Greenho 46 Plectus spp Podgorica 2006/2007 Pajović, Ouintaniila, Bird Greenho 47 Plectus tenuis Podgorica 2006/2007 Pajović, Ouintaniila, Bird Greenho 48 Polikilolaimus oxycerca Podgorica 2006/2007 Pajović, Ouintaniila, Bird Greenho 48 Polikilolaimus oxycerca Podgorica 2006/2007 Pajović, Ouintaniila, Bird Greenho 48 Pahabditis spp Podgorica 2006/2007 Pajović, Ouintaniila, Bird Greenho 2006/2007 Pajović, Ouintaniila, Bird Greenho 2006/2007 Pajović, Ouintaniila, Bird Greenho 49 Rhabditis spp Podgorica 2006/2007 Pajović, Ouintaniila, Bird Greenho 50 Rotylenchus spp Pijevija 1985 Dimitrijević, Nezić Gladiola to 50 Rotylenchus spp Pijevija 1985 Dimitrijević, Nezić Potato fi 51 Rotylenchus spp Podgorica 2006/2007 Pajović, Ouintaniila, Bird Greenho 51 Rotylenchulus spp Podgorica 2006/2007 Pajović, Ouintaniila, Bird Greenho 52 Rotylenchulus spp Podgorica 2006/2007 Pajović, Ouintaniila, Bird Greenho 51 Rotylenchulus spp Podgorica 2006/2007 Pajović, Ouintaniila, Bird Greenho 52 Rotylenchulus spp Podgorica 2010 Pajović Ouintaniila, Bird Greenho 53 Trichodorus spp Pijevija 1985 Dimitrijević, Nezić Potato fi 54 Tylenchorhynchus spp Podgorica 1988 Jovičić, Stamenković Greenho 55 Tylenchulus semipenetrans Ulcinj 1988 Uvičinić and Tiodorović Citrus 56 Tylenchus spp Podgorica 1988 Jovičić, Stamenković Greenho 57 Xiphinema spp Podgorica 1988 Jovičić, Stamenković Greenho 57 Xiphinema smine Ulcinj 1998 Barsi Oaktr Stylenchus spp Podgorica 1988 Barsi Oaktr Stylenchus spp Podgorica 1998 Barsi Oaktr Stylenchus spp Pijevija 1995 Barsi Oaktr Stylenchus spp Podgorica 1998 Barsi Oakt						
42 Pratylenchus spp			Plievija			
Agratylenchus neglectus   Podgorica   2010   Pajović   Greenho		Protulonohus opp				
44   Pailenchus spp   Pijevija   1985   Dimitrijević, Ivezić   Potato fi   45   Panagrelius spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   46   Piectus spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   47   Piectus tenuis   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   48   Poikiololamus oxycerca   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   49   Rhabditis spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   49   Rhabditis spp   Ulcinj   1988   Dimitrijević, Ivezić   Gladiolat   49   Rhabditis spp   Ulcinj   1988   Dimitrijević, Ivezić   Gladiolat   50   Rotylenchus spp   Pijevija   1985   Dimitrijević, Ivezić   Potato fi   51   Rotylenchulus spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   51   Rotylenchulus spp   Podgorica   2010   Pajović   Potato fi   52   Rotylenchulus macrodoratus   Podgorica   2010   Pajović   Potato fi   53   Trichodorus spp   Pijevija   1985   Dimitrijević, Ivezić   Potato fi   54   Tylenchorhynchus spp   Pijevija   1985   Dimitrijević, Ivezić   Potato fi   54   Tylenchorhynchus spp   Podgorica   1988   Dimitrijević, Ivezić   Potato fi   55   Tylenchus spp   Podgorica   1988   Jovičić, Stamenković   Greenho   55   Tylenchus spp   Podgorica   1988   Jovičić, Stamenković   Greenho   55   Tylenchus spp   Podgorica   1988   Dimitrijević, Ivezić   Potato fi   56   Tylenchus spp   Podgorica   1988   Dimitrijević, Ivezić   Potato fi   56   Tylenchus spp   Podgorica   1988   Dimitrijević, Ivezić   Potato fi   57   Kiphinema spp   Podgorica   1988   Barsi   Oak tre   58   Xiphinema vanum   Crkvine   1998   Barsi   Oak tre   59   Xiphinema index   Morinj   1994   Barsi   Paguline   60   Xiphinema index   Morinj   1994   Barsi   Paguline   61   Xiphinema marencanum   Herceg Novi   1988   Krnjaji   Vineyar   62   Xiphinema pachtaicum   Ulcinj   1994   Barsi   Paguline   63   Xiphinema pachtaicum   Ulcinj   1994   Barsi   Paguline   Vineyar   64   Xiphinema pachtaicum   Ulcinj   1994   Barsi   Paguline						Greenhouse
As   Panagrellus spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho						
Podgorica   2006/2007 Pajović, Quintanilla, Bird   Greenho		Panagrellus spp				Greenhouse
47   Piectus tenuis   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   48   Pokiloliaimus oxycerca   Podgorica   2006/2007   Pajović, Cuintanilla, Bird   Greenho   49   Rhabditis spp   Podgorica   1988   Jovičić, Stamenković   Greenho   49   Rhabditis spp   Ulcinj   1988   Dimitrijević, Ivezić   Gladiola to   50   Rotylenchulus spp   Pijevija   1985   Dimitrijević, Ivezić   Potato fi   51   Rotylenchulus spp   Pijevija   1985   Dimitrijević, Ivezić   Potato fi   51   Rotylenchulus spp   Podgorica   2006/2007   Pajović, Quintanilla, Bird   Greenho   25   Rotylenchulus macrodoratus   Podgorica   2010   Pajović   Greenho   53   Trichodorus spp   Pijevija   1985   Dimitrijević, Ivezić   Potato fi   47   Iylenchorhynchus spp   Pijevija   1985   Dimitrijević, Ivezić   Potato fi   54   Tylenchorhynchus spp   Podgorica   1988   Jovičić, Stamenković   Greenho   55   Tylenchulus semipenetrans   Ulcinj   1988   Vučinić and Tiodorović   Greenho   55   Tylenchus spp   Pijevija   1985   Dimitrijević, Ivezić   Potato fi   57   Vijenchus spp   Pijevija   1985   Dimitrijević, Ivezić   Potato fi   57   Vijenchus spp   Pijevija   1985   Dimitrijević, Ivezić   Potato fi   57   Vijenchus spp   Pijevija   1985   Dimitrijević, Ivezić   Potato fi   57   Vijenchus spp   Pijevija   1985   Dimitrijević, Ivezić   Potato fi   57   Vijenchus spp   Pijevija   1985   Dimitrijević, Ivezić   Potato fi   57   Vijenchus spp   Pijevija   1985   Dimitrijević, Ivezić   Potato fi   58   Xiphinema varium   Crkvine   1998   Barsi   Oak tre spo   Siphinema varium   Danilovgrad   1999   Barsi   Carpinus on foi   Xiphinema imdex   Morinj   1994   Barsi   P. aquilit   Gazinina   Morinj   1994   Barsi   P. aquilit   Gazinina   Morinj   1994   1995   Barsi   Alamberti   Unknov   1900   Barsi and Lamberti   Unknov   1900   Ba	46	Plectus spp				Greenhouse
AB Poikilolaimus oxycerca   Podgorica   2006/2007   Pajović, Quintanilla, Bill'd Greenho   Podgorica   1988   Jovičić, Stamenković   Greenho   2006/2007   Pajović, Quintanilla, Bill'd Greenho   Pajović, Podgorica   Podgorica   Podgorica   Dimitrijević, Nezić   Potato fi   Pajović, Podgorica   Podgori						Greenhouse
49   Rhabditis spp						Greenhouse
49 Rhabditis spp		_				
49 Rhabditis spp	49	rnapditis spp	Podgorica	2006/2007		Greenhouse
Foliation   Foli			Ulcinj		Dimitrijević, Ivezić	Gladiola bulbs
51 Rotylenchulus spp         Pijevlja         1985         Dimitrijević, ivezić         Potato fi           51 Rotylenchulus spp         Podgorica         2006/2007         Pajović, Quintilla, Bird         Greenho           52 Rotylenchulus macrodoratus         Podgorica         2010         Pajović         Greenho           53 Trichodorus spp         Pijevlja         1985         Dimitrijević, Ivezić         Potato fi           54 Tylenchorhynchus spp         Pijevlja         1985         Dimitrijević, Ivezić         Potato fi           55 Tylenchulus sempenetrans         Ulcinj         1988         Jovičić, Stamenković         Greenho           56 Tylenchus spp         Pijevlja         1985         Dimitrijević, Ivezić         Potato fi           56 Tylenchus spp         Podgorica         1988         Jovičić, Stamenković         Greenho           56 Tylenchus spp         Podgorica         1988         Jovičić, Stamenković         Greenho           57 Xiphinema spp         Podgorica         1988         Jovičić, Stamenković         Greenho           57 Xiphinema spp         Podgorica         1988         Jovičić, Stamenković         Greenho           58 Xiphinema varium         Crkvine         1998         Barsi         Oak tre           59 Xiphinema motene	50 F	Rotylenchus spp	Pljevlja	1985	Dimitrijević, Ivezić	Potato field
Foldprica   2006/2007   Pajović, Quintanilla, Bird   Greenho   Service   Rotylenchulus   Service   Podgorica   2010   Pajović   Greenho   Service   Podgorica   2010   Pajović   Greenho   Service   Podgorica   2010   Pajović   Greenho   Service   Podgorica   Podgoric	51 F	Rotylenchulus spp			Dimitrijević, Ivezić	Potato field
SZ Rotylenchulus macrodoratus   Podgorica   2010   Pajović   Greenho	<b>51</b> <i>F</i>	Rotylenchulus spp				Greenhouse
53 Trichodorus spp						Greenhouse
54 Tylencharhyrachus spp         Pijevlja         1985         Dimitrijević, lvezić         Potato fi           54 Tylenchorhyrachus spp         Podgorica         1988         Jovičić, Stamenković         Greenho           55 Tylenchulus semipenetrans         Ulcinj         1988         Vučinić and Tiodorović         Citrust           56 Tylenchus spp         Pljevlja         1985         Dimitrijević, lvezić         Potato fi           56 Tylenchus spp         Podgorica         1988         Jovičić, Stamenković         Greenho           57 Xjphinema spp         Pijevlja         1985         Dimitrijević, lvezić         Potato fi           58 Xjphinema varium         Crkvine         1998         Barsi         Oak tr          59 Xjphinema montenegrinum         Morinj         1998         Barsi         Carpinus on           60 Xjphinema ijiricum         Danilovgrad         1999         Barsi         P. aquilir           62 Xjphinema index         Morinj         2000         Barsi and Lamberti         unknov           63 Xiphinema diversicaudatum         Morinj         2000         Barsi and Lamberti         Vineyar           64 Xiphinema mericanum         Herceg Novi         1988         Krnjajić         Vineyar           65 Xiphinema pachtaicum         Ulc			Pljevlja	1985	Dimitrijević, Ivezić	Potato field
54 Tylencharhynchus spp   Podgorica   1988   Jowlöic, Stamenkowic   Greenho	54 7	Tylenchorhynchus spp	Pljevlja			Potato field
55 Tylenchulus semipenetrans         Ulcinj         1988         Vučinić and Tlodorović         Citrus           56 Tylenchus spp         Pljevlja         1985         Dimitrijević, lvezić         Potato fi           56 Tylenchus spp         Podgorica         1988         Jovčić, Stamenković         Greenho           57 Xiphinema spp         Pljevlja         1985         Dimitrijević, lvezić         Potato fi           58 Xiphinema varium         Crtkvine         1998         Barsi         Oak tr          59 Xiphinema imotenegrinum         Morinj         1998         Barsi         wood           60 Xiphinema illyricum         Danilovgrad         1999         Barsi         Carpinus or           61 Xiphinema simile         Ulcinj         1994         Barsi         P. aquilir           62 Xiphinema index         Morinj         2000         Barsi and Lamberti         unknov           63 Xiphinema diversicaudatum         Horinj         2000         Barsi and Lamberti         Vineyar           64 Xiphinema pachtaicum         Herceg Novi         1988         Krnjajič         Vineyar           65 Xiphinema pachtaicum         Ulcinj, Valdanos         1994         Barsi         P. aquilir	54 7	Tylenchorhynchus spp			Jovičić, Stamenković	Greenhouse
56 Tylenchus spp         Pljevlja         1985         Dimitrijević, kezić         Potatof           56 Tylenchus spp         Podgorica         1988         Jovičić, Stamenkowić         Greenho           57 Xiphinema spp         Pljevlja         1985         Dimitrijević, Ivezić         Potato f           58 Xiphinema spp         Pljevlja         1998         Barsi         Cak tre           58 Xiphinema imotenegrinum         Morinj         1998         Barsi         wood           60 Xiphinema illyricum         Danilovgrad         1999         Barsi         Carpinus on           61 Xiphinema simile         Ulcinj         1994         Barsi         P. aquilir           62 Xiphinema index         Morinj         2000         Barsi and Lamberti         Unknow           63 Xiphinema diversicaudatum         Morinj         2000         Barsi and Lamberti         Vineyar           64 Xiphinema ma mericanum         Herceg Novi         1988         Krnjajić         Vineyar           65 Xiphinema pachtaicum         Ulcinj, Valdanos         1994         Barsi         P. aquilir	55 7	Tylenchulus semipenetrans	Ulcinj	1988		Citruses
56 Tylenchus spp         Podgorica         1988         Joxičis, Stamenković         Greenho           57 Xiphinema spp         Pljevlja         1985         Dimitrijević, kvežć         Potato fi           58 Xiphinema varium         Crkvine         1998         Barsi         Oak tr          59 Xiphinema inne         Morinj         1998         Barsi         wooc           60 Xiphinema illyricum         Danilovgrad         1999         Barsi         Carpinus on           61 Xiphinema simile         Ulcinj         1994         Barsi         P. aquilir           62 Xiphinema indexi         Morinj         2000         Barsi and Lamberti         unknov           63 Xiphinema diversicaudatum         Stoliv, Stoliv, 1994, 1996, 1994         Barsi, Barsi, Wineyar         Vineyar           64 Xiphinema pachtaicum         Herceg Novi         1988         Krnjajić         Vineyar           65 Xiphinema pachtaicum         Ulcinj, Valdanos         1994         Barsi         P. aquilir	56 7				Dimitrijević, Ivezić	Potato field
57 Xiphinema spp         Pijevlja         1985         Dimitrijević, ivezić         Potatof           58 Xiphinema varium         Crtkvine         1998         Barsi         Oak tre           59 Xiphinema montenegrinum         Morinj         1998         Barsi         wood           60 Xiphinema ilyricum         Danilovgrad         1999         Barsi         Carpinus on           61 Xiphinema simile         Ulcinj         1994         Barsi         P. aquilir           62 Xiphinema index         Morinj         2000         Barsi and Lamberti         unknov           63 Xiphinema diversicaudatum         Morinj         2000         Barsi and Lamberti         Vineyar           64 Xiphinema americanum         Herceg Novi         1988         Krnjajić         Vineyar           65 Xiphinema pachtaicum         Ulcinj, Valdanos         1994         Barsi         P. aquilir	56 7	Tylenchus spp	Podgorica	1988	Jovičić, Stamenković	Greenhouse
58 Xiphinema varium         Crkvine         1998         Barsi         Oak tre           59 Xiphinema montenegrinum         Morinj         1998         Barsi         wood           60 Xiphinema illyricum         Danilovgrad         1999         Barsi         Carpinus or           61 Xiphinema simile         Ulcinj         1994         Barsi         P. aquilir           62 Xiphinema index         Morinj         2000         Barsi and Lamberti         unknov           63 Xiphinema diversicaudatum         Stoliv, Stoliv,         1994, 1996,         Barsi, Barsi,         Vineyar           64 Xiphinema americanum         Herceg Novi         1968         Krnjajić         Vineyar           65 Xiphinema pachtaicum         Ulcinj, Valdanos         1994         Barsi         P. aquilir	57 )	Xiphinema spp	Pljevlja	1985	Dimitrijević, Ivezić	Potato field
59 Xiphinema montenegrinum         Morinj         1998         Barsi         wood           60 Xiphinema iliyricum         Danilovgrad         1999         Barsi         Carpinus or           61 Xiphinema simile         Ulcinj         1994         Barsi         P. aquilir           62 Xiphinema index         Morinj         2000         Barsi and Lamberti         unknow           63 Xiphinema diversicaudatum         Stoliv, Stoliv,         1994, 1996,         Barsi, Barsi,         Barsi and Lamberti           64 Xiphinema mericanum         Herceg Novi         1988         Krnjajić         Vineyar           55 Xiphinema pachtaicum         Ulcinj, Valdanos         1994         Barsi         P. aquilir	58 >	Xiphinema varium		1998	Barsi	Oak tree
60 Xiphinema illyricum         Danilovgrad         1999         Barsi         Carpinus or           61 Xiphinema simile         Ulcinj         1994         Barsi         P. aquilli           62 Xiphinema index         Morinj         2000         Barsi and Lamberti         unknov           63 Xiphinema diversicaudatum         Stoliv, Stoliv,         1994, 1996,         Barsi, Barsi,         Vineyar           64 Xiphinema americanum         Herceg Novi         1988         Krnjajić         Vineyar           65 Xiphinema pachtaicum         Ulcinj, Valdanos         1994         Barsi         P. aquilir	59D	Kiphinema montenearinum				wood
61 Xiphinema simile         Ulcinj         1994         Barsi         P. aquilifi           62 Xiphinema index         Morinj         2000         Barsi and Lamberti         unknov           63 Xiphinema diversicaudatum         Stoliv, Stoliv, Morinj         1994, 1996, 2000         Barsi, Barsi, Barsi and Lamberti         Vineyar           64 Xiphinema americanum         Herceg Novi         1988         Krnjajić         Vineyar           55 Xiphinema pachtaicum         Ulcinj         1994         Barsi         P. aquilir						Carpinus orientalis
62 Xiphinema index     Morinj     2000     Barsi and Lamberti     unknov       63 Xiphinema diversicaudatum     Stoliv, Stoliv,     1994. 1996.     Barsi, Barsi, Barsi, Barsi, Barsi, and Lamberti     Vineyar       64 Xiphinema mericanum     Herceg Novi     1988     Krnjajić     Vineyar       65 Xiphinema pachtaicum     Ulcinj, Valdanos     1994     Barsi     P. aquilir				1994	Barsi	P. aquilinum
63 Xiphinema diversicaudatum     Stoliv, Stoliv, Morinj     1994, 1996, 2000     Barsi, Barsi, Barsi, Barsi and Lambertl     Vineyar       64 Xiphinema americanum     Herceg Novi     1968     Krnjajić     Vineyar       65 Xiphinema pachtaicum     Ulcinj, Valdanos     1994     Barsi     P. aquilir						unknown
64 Xiphinema americanum     Morinj     2000     Barsi and Lamberti     Vineyar       64 Xiphinema americanum     Herceg Novi     1988     Krnjajić     Vineyar       55 Xiphinema pachtaicum     Ulcinj, Valdanos     1994     Barsi     P. aquilli	-	'				
64 Xiphinema americanum     Herceg Novi     1968     Kmjajić     Vineyar       65 Xiphinema pachtaicum     Ulcinj, Valdanos     1994     Barsi     P. aquillir	63	xipninema diversicaudatum	Morinj			Vineyards
65 Xiphinema pachtaicum Ulcinj, Valdanos 1994 Barsi P. aquillir	64)	Xiphinema americanum	Herceg Novi			Vineyards
						P. aquilinum
			Lazi, Morinj, Petrovac	2002		Grassland
						Vineyards

### **CONCLUSIONS**

Quite little is known about the presence and role of plant-parasitic nematodes, or nematodes at all, in relation to crop production in Montenegro.

Beside other plant parasitic nematodes reported from the Montenegro and mentioned above, the results of the nematode survey indicate that *Meloidogyne* spp. are the most destructive and common nematode taxa in Montenegro. They can result in major losses to crop productivity. Among them is *M. incognita*, which can cause major losses of tomato, cucumber, pepper and lettuce, and is the most common root-knot nematode species detected in the country. The other root-knot nematodes detected, namely *M. arenaria*, *M. ardeniensis*, *M. javanica* and *M. hapla*, are harmful, but not as wide-spread as *M. incognita*.

Considering these issues, attention must be paid to present and new root-knot nematodes before climate changes force them into vegetable as well as fruit production.

Climate change has the same effect on other nematode genera in plant production. For efficient management of parasitic nematodes, it is crucial to keep monitoring agricultural progress while maintaining full interaction with farmers. On-farm research/nematode management demonstrations and on-farm education programs are likely to be the most effective initiatives.

Apart from the present species or taxa of parasitic nematodes, there is the high possibility that some usually quarantined pests, such as potato cyst nematodes or *B. xylophilus* might be accidentally introduced, and that they would then adapt to Montenegro's agriculture. Considering such risks, a phytosanitary sector in Montenegro should take steps to prevent, or at least detect, the introduction of new species as soon as possible.

Such a sector may eventually implement bacterial-feeding species and other free living species. These species may eventually be used as indicators of soil quality, which is important for sustainable plant production. They can be also be used as living space competitors against parasitic nematodes in soil agroecosystems.

In this report we have presented data collected from a myriad of external sources to buttress the results of our survey, which was administered during 2006-2007 in greenhouses.

Most of the data that have been summarized in this report are found in non published extension service reports. Most of the service reports are the results of analyses done by other institutions at the request of the Ministry of Agriculture of Montenegro, or they were done through inter-institutional cooperation at a previous time. Some of the data are taken from published scientific papers done by scientists from ex Yugoslavia, and then more recently from Montenegro.

In total, we reported 65 different species and taxons of nematodes in plant production in Montenegro. Alongside the results of survey, all of the known literature was assembled, reviewed and summarized in Table 08, which was designed to include information about the taxa, collection location, publication date, and the authors-reporters.

In vineyards as of 2012, 4 species have been reported (*Oxydirus oxycephaloides*, *Xiphinema americanum*, *X. diversicaudatum* and *X. pachtaicum*). In potato fields, 18 genuses and 3 species (*Ditylenchus intermedius*,

D. myceliophagus and Heterodera trifolii) have been found. In open field vegetable production only the genus Meloidogyne has been reported, but in the greenhouses 25 genuses and 13 species have been detected (Cuticularia oxycerca, Eucephalobus oxyuroides, Helicotylenchus pseudorobustus, H. platyurus, Meloidogyne hapla, M. incognita, M. javanica, M. arenaria, M. ardenensis, Plectus tenuis, Poikilolaimus oxycerca, Pratylenchus neglectus and Rotylenchulus macrodoratus). In orange and tangerine orchards, as of 2012, only two species have been reported (Oxydirus oxycephaloides and Tylenchulus semipenetrans). Quite a small number of species have been reported from forests, including some new species from the Longidoridae family (Xiphinema variorum, X. montenegrinum, X. illyricum, Longidorus intermedius and L. piceicola). Finally, in the case of flowers, meadows, pastures and weeds, a total of 4 genuses and 4 species have been reported (Meloidogyne naasi, M. arenaria, Xiphinema simile and X. pachtaicum).

#### **ACKNOWLEDGEMENTS**

This paper includes results of the Project "New induced invasive pests in plant production in Montenegro", financed by Ministry of Science of Montenegro (2012-2014).

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# PREGLED IZVJEŠTAJA IZ BILJNE NEMATOLOGIJE DO 2012 GODINE

### SAŽETAK

Relativno malo se zna o ulozi fitoparazitnih i nematoda generalno u biljnoj poljoprivrednoj proizvodnji u Crnoj Gori. Glavni izvor podataka za rad su bili publikovani naučni radovi koji su za temu imali nematode i nematozna oboljenja, a koji se odnose na Crnu Goru. Uzeti su u obzir kao veoma značajni izvori informacija nepublikovani savjetodavni i izvještajno-prognozni bilteni vezani za nematode u našoj poljoprivrednoj proizvodnji. Pored navedenog kao noviji izvor podataka koristili smo rezultate monitoringa dvadeset objekata zaštićenog prostora u Zetsko-Bjelopavlićkoj ravnici.

Napravljen je istorijski pregled publikcija, radova i biltena. A kako je ovo, koliko je nama poznato, prvi pregledni rad o nematodama u biljnoj proizvodnji u Crnoj Gori, dat je i pregled svih do sada utvrđenih vrsta i taksona nematoda po biljnim vrstama.

Ukupno 65 različitih štetnih, nematofagnih, bakteriofagnih i slobodno živećih vrsta i taksona nematoda je nađeno do 2012 godine u Crnoj Gori.

Ključne riječi: pregled, vrste nematoda, taksoni nematoda