Interreg - IPA CBC
Italy - Albania - Montenegro
EUROPEAN UNION
CROSS BORDER OL

Najbolje poljoprivredne prakse za očuvanje starih maslinjaka

Best agronomic practices for conservation of ancient olive orchards

Bar, Crna Gora
2021.

Naziv projekta finansiranog iz programa **Interreg IT-ALB-CG**

Prekogranična saradnja za održivi razvoj i turizam kroz valorizaciju ruralnog kulturnog nasljeđa i očuvanje prirodnih dobara u područjima sa starim maslinjacima

Glavni cilj projekta je turistička promocija održivog razvoja zasnovanog na prirodnim bogatstvima pejzaža sa starim maslinjacima.

Partneri:

Agricultural University of Tirana - AUT
CIHEAM BARI
URBAN RESEARCH INSTITUTE
Park Authority of Venafro
Municipality of Bar
Association for Sustainabl Regional Groves - Valdanc

Poljoprivredni fakultet u Tirani (AL)
CIHEAM Bari (IT)
Institut za urbana istraživanja (AL)
Park maslina Venafro (IT)
Opština Bar (CG)
Udruženje za održivi razvoj, reg. saradanju i maslinarstvo Valdanos (CG)

Ukupan budžet projekta:**625 440.21**€

Osnovne aktivnosti

- mapiranje starih maslina
- utvrđivanje najboljih poljoprivrednih praksi
- utvrđivanje stanja biodiverziteta u području mapiranja

Glavni rezultati projekta

Mape lokalnih maslinjaka (CG, ALB, IT-Molise)
Lokalni razvojni planovi
Zajednička mapa starih maslinjaka u IT, ALB i CG
Prekogranični turistički akcioni plan za pametno upravljanje starim maslinjacima

Full name of the project financed through **Interreg IT-ALB-MNE**

Cross-border cooperation for sustainable development and tourism, through the valorization of rural cultural heritage and conservation of natural asset of areas with ancient olive groves

The main objective of the project is to promote sustainable tourism development based on the natural assets of landscape with ancient olive groves.

Partners:

Agricultural University of Tirana - AUT
CIHEAM BARI
URBAN RESEARCH INSTITUTE
Park Authority of Venafro
Municipality of Bar
Association for Sustainabl Regional Groves - Valdanc

LP: Agricultural University of Tirana AUT
PP2: CIHEAM BARI
PP3: Urban Research Institute URI
PP4: Olive Park Venafro
PP5: Municipality of BAR
PP6: Association for sustainable regional olive farming Valdanos

Total budget of the Project: **625 440,21** €

Main activities

- mapping of the ancient olive trees
- identifying the best agricultural practices
- analyzing the biodiversity in the mapped area

The main results of the Project

Maps of local olive groves (Montenegro, Albania and Italy-Molise)
Local development plans
Common map of ancient olive groves in IT, ALB and MNE
Cross-border tourism action plan for the smart management of AOOs

UVOD

Cross Border OL projekat finansira se iz programa **Interreg IPA CBC Italija-Albanija-Crna Gora** u okviru prioritetne ose *Pametno upravljanje prirodnim i kulturnim nasljeđem sa ciljem unapređenja prekograničnog održivog turizma i teritorijalnih atrakcija.* Glavni cilj projekta je promocija održivog razvoja turizma zasnovanog na prirodnom bogatstvu pejzaža sa starim maslinjacima. Projekat će doprinijeti promociji održivih turističkih aktivnosti i očuvanju i zaštiti prirodnih resursa u područjima starih maslinjaka, kako bi se podigla svijest lokalnog stanovništva o sopstvenom kulturnom nasljeđu povezanom sa tradicionalnim maslinarstvom, kroz aktiviranje procesa uspostavljanja lokalnih strategija razvoja.

Zainteresovane strane u *CROSS BORDER OL* projektu se mogu identifikovati na lokalnom i nacionalnom nivou. Lokalni maslinari, lokalna uprava, turistička organizacija, privatni vlasnici lokalnih restorana i smještajnih kapaciteta, resorna ministarstva, Uprava za zaštitu kulturnih dobara su identifikovani kao neke od strana na koje rezultati projekta imaju pozitivan uticaj.

Kako bi se uspješno završile aktivnosti u okviru prvog paketa implementacije, identifikacija i objavljivanje najboljih poljoprivrednih praksi očuvanja pejzaža sa starim maslinjacima ima za cilj da prepozna i karakteriše postojeće prirodno nasljeđe u projektnom području u pogledu bogatstva biodiverziteta. Prvi implementacioni paket treba da ispuni tri rezultata, i to: **i) Mapiranje stabala starih maslina i maslinjaka (AT1.1), ii) Karakterizacija biodiverziteta (AT1.2) i iii) Identifikacija i objavljivanje najboljih poljoprivrednih praksi za očuvanje pejzaža sa starim maslinjacima (AT1.3).**

Projektni tim Opštine Bar je uspio da identifikuje stare maslinjake i pojedinačna stara stabla, kao i kulturno-istorijske znamenitosti u blizini Starog Bara, tj. na području maslinjaka Džidžarin.

Podaci o odabranim starim maslinama su digitalizovani i slojevi u GIS-u pripremljeni za proizvodnju mapa. Takođe,

biodiverzitet je okarakterisan u istom maslinjaku i brojne biljne vrste su identifikovane (294), npr. dvije vrste zaštićene nacionalnim zakonom *(Cyclamen hederifolium i Spiranthes spiralis)*, kao i šest endemskih biljnih vrsta.

Brošura najboljih poljoprivrednih praksi ima za cilj da pojednostavi identifikaciju i širenje praksi koje gotovo da nemaju negativan uticaj na životnu sredinu, a tiču se zaštite starih maslinjaka kroz set poljoprivrednih praksi kao što su sadnja, obrada, upravljanje plodnošću zemljišta, navodnjavanje, borba protiv korova i štetočina, rezidba i berba.

Kako bi se odredile najbolje poljoprivredne prakse, pogodne za sprovođenje u Džidžarinu, ali i u cjelokupnom maslinarskom području opštine Bar, Projektni tim Opštine Bar je sproveo anketiranje maslinara, potvrdio rezultate na terenu, uvrstio savjete eksternih eksperata i na osnovu kumulativnih rezultata pripremio praktičan i koristan vodič sa ciljem intenzifikacije maslinarstva.

INTRODUCTION

Cross Border OL project is funded through the **Interreg IPA CBC Italy-Albania-Montenegro Program** under the Priority Axes *Smart management of natural and cultural heritage for the exploitation of cross border sustainable tourism and territorial attractiveness.* Its main objective is to promote sustainable tourism development based on the natural assets of the landscape with Ancient Olive Orchards (AOOs). The project will contribute to promote sustainable tourism activities and to conserve and protect natural resources in areas with AOOs to recover awareness of local populations on their own cultural heritage linked to traditional olive culture, by activating a process of setting local strategies of development.

Stakeholders that are involved within the *CROSS BORDER OL* project may be considered on a local and national level. Local olive growers, local government, local tourism organizations, owners of local restaurants and private accommodation facilities, line Ministries, Administration for the Protection of

Cultural Properties are identified as some of the positively influenced stakeholders.

In order to complete the activities within the first implementation work package, identification and sharing the best practices for conservation of the landscape of ancient olive orchards aiming to identify and characterize the existing natural heritage of the involved countries in terms of landscape and biodiversity richness in AOOs had to be composed. WP T1 should fulfill three deliverables, notably: **i) Mapping olive trees and groves (A.T.1.1), ii) Characterization of biodiversity of AOOs (A.T.1.2) and iii) Identification and sharing of best practices for conservation of the landscape of ancient olive orchards (A.T.1.3).**

Project Management Team of the Municipality of Bar managed to identify ancient olive groves and individual trees, as well as cultural-historical objects within the nearby area of the Old Town of Bar, *Džidžarin* olive orchard.

Data about ancient olive trees have been digitized and the layers in GIS are ready for map production. Also, biodiversity has been characterized within the same orchard and numerous plant species were identified (294), as well as two species protected with national legislation *(Cyclamen hederifolium and Spiranthes spiralis)*, as well as six endemic plant species.

Best practices brochure aims at facilitating the identification and sharing of best practices with low environmental impact for the conservation of the AOO areas through a set of good agriculture practices such as planting, soil cultivation, soil fertility management, irrigation, weed, and pest management, pruning and harvesting.

In order to determine best agronomic practices, suitable for *Džidžarin* olive orchard and overall olive growing in the area of Bar municipality, the Project Management Team of PP5 conducted surveys of olive growers, validated results on the field, incorporated the advice of external experts, and based on the cumulative data successfully prepared a practical and useful manual/guide for olive growing intensification.

PREGLED CRNOGORSKOG MASLINARSTVA

Crna Gora je jugoistočna mediteranska zemlja koja ima ukupnu površinu od 13 812,00 km^2, kao i populaciju od oko 650 000 ljudi. Crnogorska obala je duga 293,5 km, sa veoma atraktivnim plažama i turističkim mjestima.

Maslinjaci su pristuni na oko 3 200,00 ha, što predstavlja oko 1/3 ukupne površine pod voćnjacima u Crnoj Gori. Masline se gaje u priobalnom području, pod snažnim uticajem mediteranske klime. Prosječna temperatura je 15,5°C, sa apsolutnim minimumom od -8,5°C i apsolutnim maksimum od 40,0°C. Prosječne godišnje padavine iznose oko 1642 mm. Maslinarsko područje je uglavnom brdovito (85%), smješteno na nagibima planina Orjena, Lovćena i Rumije.

Dokaz duge maslinarske tradicije su nekolike hiljade godina stari maslinjaci, sa dva izuzetna primjerka starih stabala – *Stara maslina* na Mirovici u Baru, za koju je dokazano da ima više od 2 200 godina (Slika 1) i *Velja maslina* u Ivanovićima, Budva, čija se starost procjenjuje na 2 000 godina. Smatra se da je ukupan broj starih maslina na crnogorskom primorju oko 420 000. Prosječna starost stabala maslina je od 150 do 200 godina. Visina stabala je pretežno od 7 do 10 metara, pa čak i do 15 metara. Navedeno ukazuje da uslovi nisu pogodni za sprovođenje intenzivnih poljoprivrednih praksi, kao što su zaštita i berba. Većinu maslina je potrebno rigorozno orezati i spustiti krošnju. Prosječan prinos je nizak, kreće se od 4 do 8 kg/stablu, tj. oko 1 litar ulja/stablu, što nije dovoljno da izmiri nacionalne potrebe. Većina maslinjaka je veličine između 0,2 ha i 2,0 ha, dok su relativno velika područja na Luštici (20 000 stabala) i u Ulcinju – Valdanos (80 000 stabala), dva maslinarska kompleksa zaštićena zakonom. Gaje se brojne autohtone sorte, domaće i odomaćene. Crnogorska obala, sa aspekta maslinarstva, može biti podijeljena na dva područja: *Barsko područje* (opštine Ulcinj, Bar i Budva, gdje Žutica dominira sa više od 95%) i područje *Boke kotorske* (opštine Tivat, Kotor i Herceg Novi, gdje osim

Žutice, ima i drugih sorti, kao što su *Crnica, Lumbardeška, Sitnica, Šarulja* itd.). Strane sorte *Pišolin, Lećino, Koratina, Itrana, Askolana tenera* su prisutne u oko 3% maslinjaka. Postoji interesovanje za uvođenje varijeteta sa krupnim plodom i otpornošću na niske zimske temperature. Zavisno od godine, ukupna proizvodnja maslinovog ulja u Crnoj Gori se procjenjuje na 400 do 500 tona. Sadnice se najčešće proizvode ožiljavanjem, ali postoji i potreba za kalemljenom Žuticom u vjetrovitim područjima. Usljed nepristupačnog terena i neodgovarajuće visine stabala, mehanička berba je gotovo nemoguća, međutim, tradicionalni načini sakupljanja plodova sa zemlje se polako prevazilaze. Danas, mreže se koriste za sakupljanje, kao i grebači i ostala mehanička pomagala. Vrijeme berbe se procjenjuje na osnovu boje ploda i sadržaja ulja. Osnovni problemi maslinarstva su štetočine *(Bactrocera oleae/Prays oleae – muva masline)* i patogeni *(Spilocea oleaginea – paunovo oko).*

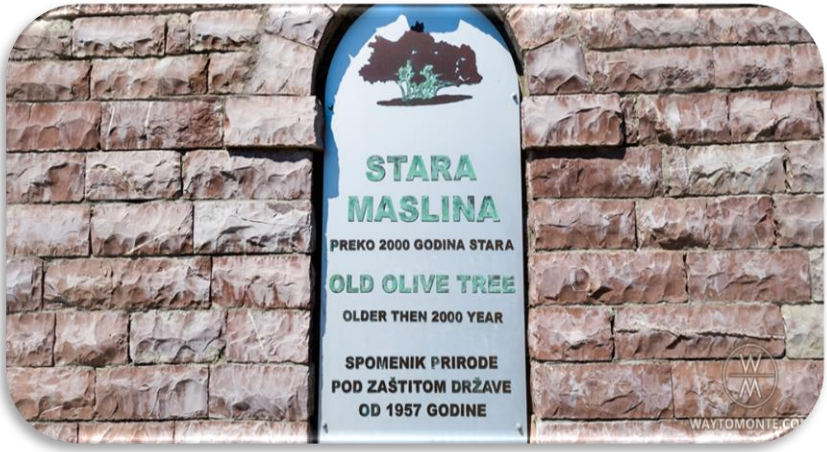
THE REVIEW OF MONTENEGRIN OLIVICULTURE

Montenegro is a south-eastern Mediterranean country that has an area equal to 13,812.00 km^2, and a total population of about 650,000 people. Montenegro's coastline is 293.5 km long, with very attractive beaches and tourist places.

Olive orchards cover about 3,200.00 ha, which represents 1/3 of the total surface under fruit trees in Montenegro. Olives are grown along a coastline, influenced by the Mediterranean climate. The average temperature is 15.5°C, with an absolute minimum of -8.5°C and an absolute maximum of 40.0°C. The average annual rainfall is about 1652 mm. The olive growing area is mainly hilly (85%), located on the slopes of the mountain massifs of *Orjen, Lovćen,* and *Rumija*.

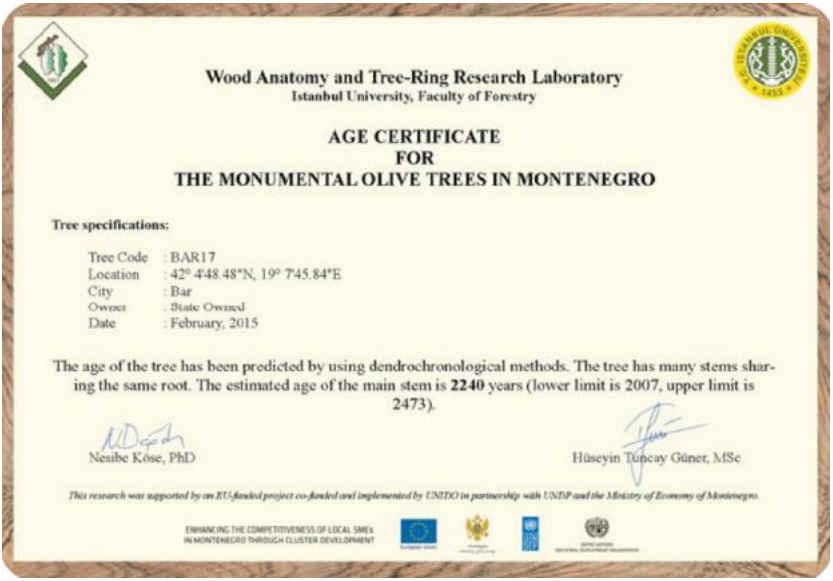
Proof of the olive growing long-term history are the few thousand old groves, with two outstanding specimens – the 'Old olive'

at *Mirovica*, Bar estimated to be more than 2,200 years old (Photo 1) and the 'Big olive' in *Ivanovići*, Budva, estimated to be close to 2,000 years old. It is considered that there are around 420,000 olive trees on the coast of Montenegro. The average age of olive trees is from 150 to 200 years. Olive tree height is from 7 to 10 m, going up to 15 meters. This is not suitable for intensive agricultural practices, such as pest control and harvesting. The majority of olives need rigorous pruning and height lowering. The average yield is low, ranges from 4 to 8 kg/tree, or about 1 liter oil/tree, which is not sufficient to cover national consumption needs. Most olive groves are between 0.2 ha and 2.0 ha in size, while relatively large areas exist in *Luštica* (20 000 trees) and *Ulcinj – Valdanos* (80 000 trees), two complexes protected by the law. There are numerous autochthonous varieties, domestic and domesticated. The Montenegrin coast, according to the olive growing, may be divided into two sub-areas: Bar sub-area (municipalities of Ulcinj, Bar, and Budva, where *Žutica* variety predominates with 95%) and Boka-kotorska sub-area (municipalities of Tivat, Kotor, and Herceg Novi, where besides *Žutica*, there are other varieties too, such as *Crnica, Lumbardeška, Sitnica, Šarulja,* etc.). Foreign varieties *Picholine, Leccino, Coratina, Itrana, Ascolana tenera* are present at about 3% in olive orchards. There is interest in varieties with large fruits and resistance to the low winter temperatures. Depending on the year, the total production of olive oil in Montenegro is estimated at 400-500 tons. Plants are mainly produced by rooting, mist propagation, but there are recent requests for grafted *Žutica* in windy areas. Due to unfavorable terrain and inadequate tree height, mechanical harvesting is almost impossible, and traditional methods of harvesting by picking the fruits from the ground are slowly changing. Nowadays, nets are widely used for harvesting, also hand shakers and other mechanical tools. Harvesting time is estimated according to the fruit color and the oil content. The main issues are pests *(Bactrocera oleae - Prays oleae)* and pathogens *(Spilocaea oleaginea).*



Stara maslina u Baru – spomenik prirode pod zaštitom države od 1957. godine u čiju se slavu organizuje tradicionalna manifestacija *Susreti pod starom maslinom*

Old olive tree in Bar municipality and its Age certificate issued by Faculty of Forestry - Istanbul University



Wood Anatomy and Tree-Ring Research Laboratory
Istanbul University, Faculty of Forestry

AGE CERTIFICATE
FOR
THE MONUMENTAL OLIVE TREES IN MONTENEGRO

Tree specifications:

Tree Code	: BAR17
Location	: 42° 4'48.48"N, 19° 7'45.84"E
City	: Bar
Owner	: State Owned
Date	: February, 2015

The age of the tree has been predicted by using dendrochronological methods. The tree has many stems sharing the same root. The estimated age of the main stem is **2240** years (lower limit is 2007, upper limit is 2473).

Nesibe Köse, PhD

Hüseyin Tuncay Güner, MSc

This research was supported by an EU-funded project co-funded and implemented by UNIDO in partnership with UNDP and the Ministry of Economy of Montenegro.

ENHANCING THE COMPETITIVENESS OF LOCAL SMEs IN MONTENEGRO THROUGH CLUSTER DEVELOPMENT

Stara maslina u Baru i Sertifikat starosti

Old olive tree in Bar municipality and its Age certificate

Maslinari su grupisani u četiri udruženja na nacionalnom nivou. Osim što udruženja međusobno pružaju podršku, komuniciraju sa Ministarstvom poljoprivrede, šumarstva i vodoprivrede, pružaju i usluge savjetodavnih službi, kontrolišu zaštitu od bolesti i štetočina, stimulišu povećanje plodnosti zemljišta, konkurišu za subvencije i bespovratne kredite itd., ali organizuju i tradicionalne manifestacije u čast masline *(Maslinijada* i *Ex Albis Ulivis* u Baru i *Dani mladog maslinovog ulja* u Boki Kotorskoj*).*

MASLINARSTVO u Baru –*Džidžarin*

Opština Bar baštini dugu tradiciju gajenja maslina zahvaljujući prirodnim karakteristikama, geografskoj poziciji i zemljišnim osobinama. Više od 1 000 hektara je posvećeno maslinarstvu i Bar se može pohvaliti sa više od 100 000 stabala maslina, od kojih se značajan broj može smatrati starim i/ili monumentalim stablima. Maslinjak Džidžarin je jedan od najvećih, najljepših i najznačajnijih maslinarskih kompleksa u Baru, koji je svega nekoliko stotina metara udaljen od Starog grada Bara. Neposredna blizina Starog grada, Kuće maslina i Stare masline na Mirovici, kao i mnogobrojni kulturno-istorijski objekti u samom maslinjaku – mostovi, ostaci crkve sv. Urbana, pješačke staze, daju ovom maslinjaku naročitu posebnost.

Najbolje poljoprivredne prakse bi trebalo da budu intenzivnije sprovođene u Džidžarinu. Cilj je da prvenstveno 30 farmera započne proces usvajanja agrotehničkih mjera, dok će iste biti dostupne i mnogim drugim maslinarima, kroz savjetodavne službe i razne druge dostupne načine komunikacije (mediji, društvene mreže). Ministarstvo poljoprivrede, šumarstva i vodoprivrede Crne Gore, kao pridružen partner na ovom projektu će podržati implementaciju najboljih poljoprivrednih praksi u budućem periodu kroz njihovu promociju prema raznim zainteresovanim stranama na nacionalnom nivou.

Odabrano područje u Džidžarinu ima značajnih sličnosti u smislu istovjetnosti pejzaža, prirodnih karakteristika i bogatstva biodiverziteta kao i u implementaciji tradicionalnih praksi, sa maslinjacima Italije, a posebno Albanije. Cilj ove brošure je da stimuliše zainteresovanost lokalnih posjetilaca i inostranih turista da obiđu ova područja i promovišu tradicionalne lokalne proizvode.

Olive growers are grouped into four Associations of olive growers. Besides regular activities, such as assistance, communication with the Ministry of Agriculture, Forestry and Water Management, provide extension services, support pest and diseases control, soil quality improvement, machinery credits etc., organize traditional events dedicated to olive and olive oil (*Maslinijada* and *Ex Albis Ulivis* in Bar and *Days of young olive oil* in Boka Kotorska).

OLIVE GROWING in Bar – *Džidžarin*

The municipality of Bar has a long tradition when it comes to olive production, due to its natural characteristics, geographical position, and soil composition. More than 1,000 hectares are dedicated to olive growing with more than 100,000 olive trees, out of which a significant number may be considered as ancient or even monumental. Olive tree plantation *Džidžarin* is one of the biggest, most beautiful, and most valuable olive complexes in Bar, which is a few hundred meters apart from the Old town of Bar. The immediate vicinity of the Old Town, the House of Olives and the Old Olive Tree on Mirovica, as well as numerous cultural and historical buildings in the olive grove itself - bridges, the remains of the church of St. Urbana, hiking trails, give this olive grove a special uniqueness.

Best Practices are supposed to be more frequently applied by the farmers in the area of *Džidžarin*. They will be available to at least 30 local farmers and many more, extension service agents and technicians, and will be disseminated to other stakeholders through various means of communication. The Ministry of Agriculture, Forestry and Water management of Montenegro (acting as an affiliated partner in this project) will support their implementation in future years by validation and promotion to the various interested stakeholders on the national level.

The selected area of *Džidžarin* orchard has similarities in terms of environmental and natural assets, landscape, and richness of biodiversity as well as in the domain of implementation of traditional agricultural practices with olive landscapes in Italy and particularly in Albania. The purpose of this brochure is to stimulate the interest of local and foreign tourists to visit these areas, thus promoting the valorization of typical local products.

Tabela 1: Maslinarstvo u Baru – osnovne informacije

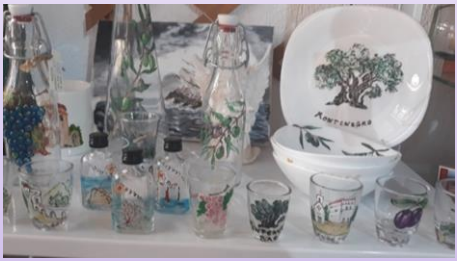
Informacije o lokaciji	Informacije o maslinama	Klimatske karakteristike
Maslinjak Džidžarin	Glavna sorta masline Žutica (98%)	Prosječna Tmax 27,8°C
Opština Bar	Prosječan prinos 4-8 kg/stablu	Prosječna Tmin 4,3°C
Jugoistočni dio crnogorske obale	Prosječna starost 150–200 godina	Prosječna temperatura 15,6°C
Koordinate 42°05'SGŠ 19°08' IGŠ	Razmak sadnje 8x8 m (≈10 000)	Godišnje padavine 1652 mm
Nadmorska visina ≈ 65–250m a.s.l.	Poljoprivreda bez navodnjavanja	Prosječna godišnja osunčanost 210,6h
Površina ≈ 69 ha	Dominantni tip zemljišta *Eutrični kambisol* (ilovasta glinuša - tekstura)	

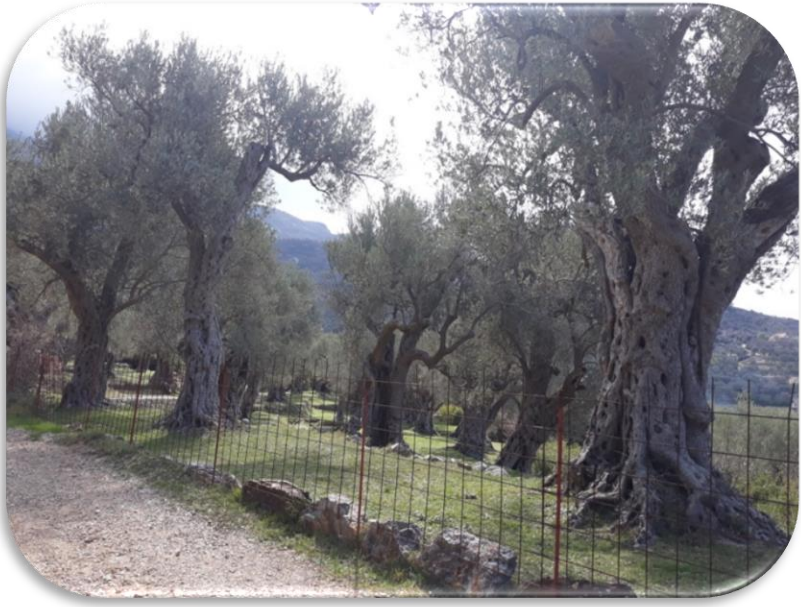
Različiti suveniri od maslina, maslinovog drveta, maslinovog ulja i uopšte masline kao simbola se izrađuju od strane lokalnih zanatlija i izlažu u suvenirnicama u Starom Baru. Ovo je jedan od najznačajnijih primjera valorizacije prirodnog i kulturološkog nasljeđa i značajna komponenta razvoja agroturizma.

Table 1: Olive growing in Bar – general information

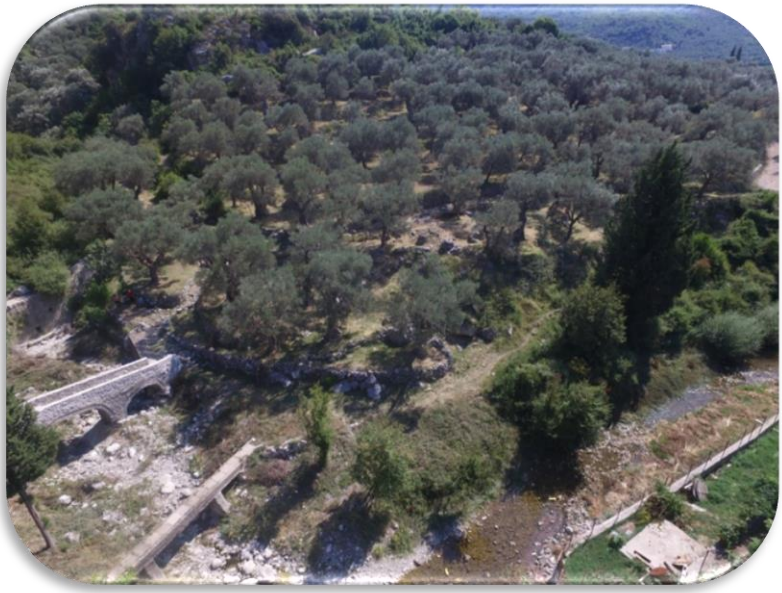
Location information	Crop information	Climate characteristics
Džidžarin olive orchard	Main olive variety – Žutica (98%)	Mean Tmax 27.8°C
Municipality of Bar	Average yield 4-8 kg/tree	Mean Tmin 4.3°C
South-eastern part of the Montenegrin coast	Average age 150-200 years	Mean Tavg 15.6°C
Coordinates 42°05'N 19°08'E	Tree density 8x8 m (≈10 000)	Mean annual rainfall 1652 mm
Elevation ≈ 65-250m a.s.l.	Rainfed agriculture	Average annual sunshine 210.6h
Surface area ≈ 69 ha	Predominant soil type *Eutric cambisol* (clay loamy texture class)	

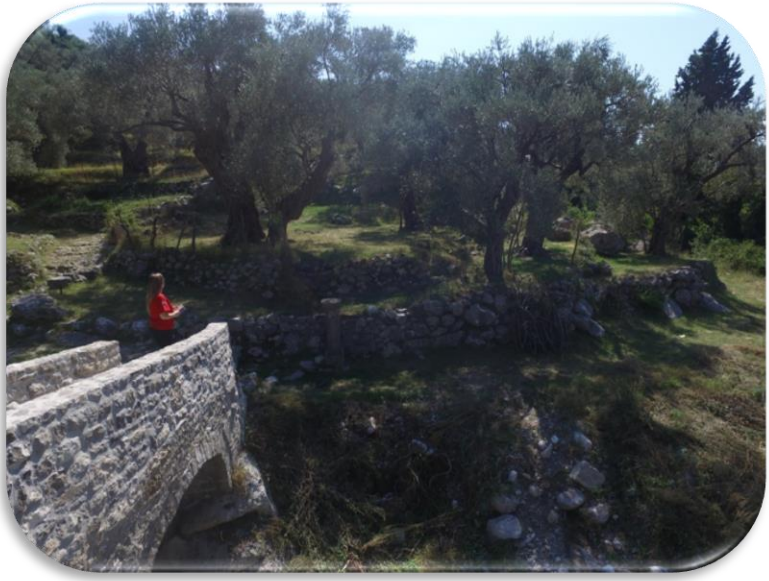
Various souvenirs made from olive fruits, olive wood, olive oil and olive as a symbol are made by the local craftsmen and exhibited in the souvenir shops within the Old town of Bar. This is one of the best practice examples for valorization of natural and cultural heritage and important component for agritourism development.





Stari maslinjaci u *Džidžarinu/ Ancient olive groves in Džidžarin*





Stari maslinjaci u *Džidžarinu/ Ancient olive groves in Džidžarin*

OSNOVNE INFORMACIJE O *DŽIDŽARINU*

Nakon anketiranja maslinara u februaru 2019. godine i provjere podataka u maslinjacima, osnovne informacije o maslinarskim praksama su prikazane u donjoj tabeli.

Table 2: Sažetak identifikovanih poljoprivrednih praksi

Karakteristike	Vrijednosti
Površina	≈70ha
Procijenjen broj stabala masline	≈10 000 stabala
Broj stabala po hektaru	≈ 140 stabala
Prinos po stablu	≈ 4–8 kg/stablu
Procijenjen broj starih stabala	≥ 5,000 stabala
Procenat učešća starih stabala	≥ 50%
Prinos po starom stablu	≈ 4–8 kg/stablu
Oblik sadnje u starim maslinjacima	Uglavnom nepravilan zbog reljefa
Međusadnja drugih voćnih vrsta	Ne, isključivo maslinjak
Međusadnja žitarica/povrća	Ne, isključivo maslinjak
Mlada stabla maslina	Da, u oko 20% maslinjaka
Vlasništvo maslinjaka	Javno-privatno
Prosječna starost privatnih vlasnika	Porodično/generacijski
Napušteni stari maslinjaci	Rijetko, ako vlasnik živi u inostranstvu
Pristupačnost i funkcionalnost infrastrukture u ruralnom području	Hitne popravke
Dostupnost mlinova	Da, dva mlina
Agroturističke aktivnosti se sprovode u ovom području	Da (turističke ture iz Starog grada)
Potencijal za ekspanziju agroturizma	Visok (istorijsko-kulturni)
Glavne prijetnje starim maslinjacima	Insekt muva masline, ljetnji požari

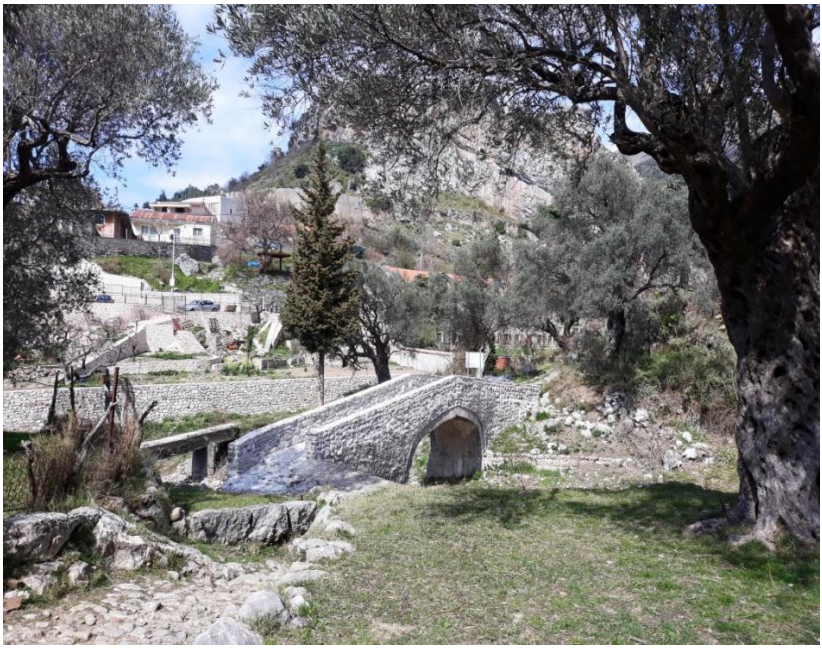
GENERAL INFORMATION ABOUT *DŽIDŽARIN*

After conducting a soil survey in February 2019 and data validation on-field, general information about olive growing in this orchard is presented below.

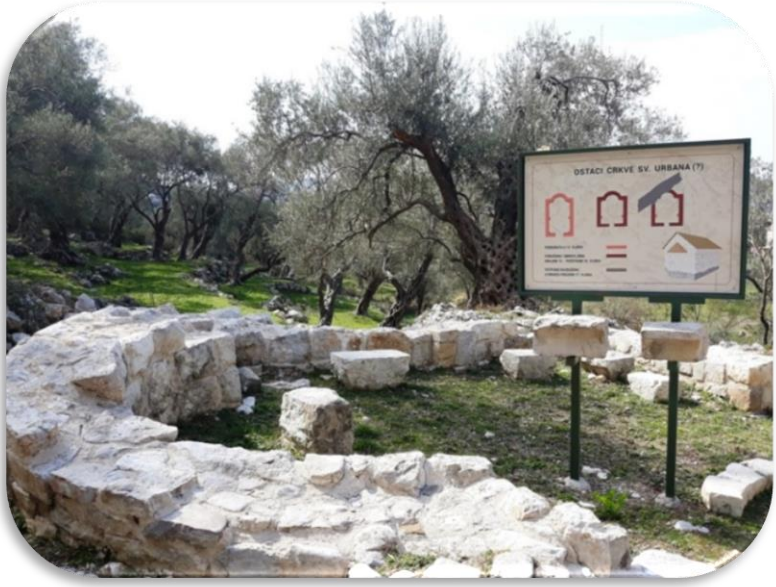
Table 2: Summary of ordinary agronomic practices

Characteristics	Values
Surface area	≈70ha
Estimated number of total olive trees	≈10,000 trees
Number of trees per ha	≈ 140 trees
Yield per tree	≈ 4-8 kg/tree
Estimated number of ancient trees	≥ 5 000 trees
Estimated percentage of ancient trees	≥ 50%
Yield per ancient olive tree	≈ 4-8 kg/tree
Plantation shape in AOOs	Mostly irregular due to relief
Intercropping with other fruit trees	No, single olive orchards
Intercropping with cereals/vegetables	No, single olive orchards
Younger trees mixed with AOOs	Yes, in about 20% of the complex
Ownership of the olive orchard	public-private
Average age of private owners	N/A (family business)
Abundant ancient olive orchards	Rare (if the owner lives abroad)
Rural infrastructure availability and functionality	Need for urgent repairs
Availability of olive oil mills	Yes, two mills
Agri-tourism activities on-going in this area	Yes (touristic tours from Old town)
Potential for expansion of agri-tourism	Very high (historical-cultural assets)
Main threats to AOOs	Insect “Olive fruit fly“ and summer fires

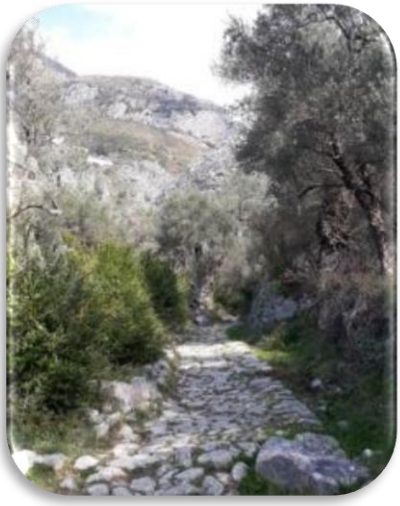
Satelitski prikaz maslinjaka *Džidžarin* /
Satellite image of *Džidžarin* olive orchard

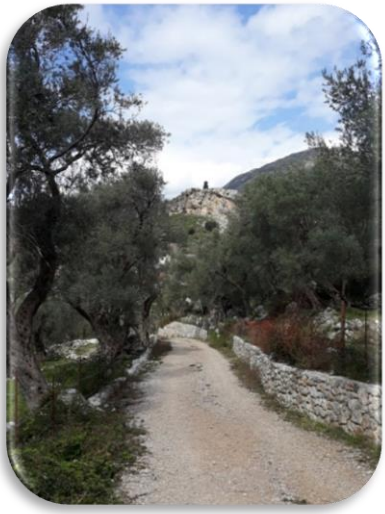


Kulturno-istorijsko blago u *Džidžarinu - Nedavno renoviran drevni most*
Cultural-historical treasure in *Džidžarin - Newly renovated ancient bridge*



Kulturno-istorijsko blago u *Džidžarinu - Ostaci crkve Svetog Urbana* / Cultural-historical treasure in *Džidžarin - St. Urban church remains*





Staza koja vodi do Starog grada Bara i glavni put kroz maslinjak / Old trace leading to Old town of Bar and the main road through the orchard

PRIMJERI DOBRIH POLJOPRIVREDNIH PRAKSI U MASLINARSTVU

REZIDBA

Orezivanje je nezamjenjiva praksa u svim maslinjacima, a posebno u starim, jer pomaže u uspostavljanju ravnoteže između vegetativnog i reproduktivnog sistema, omogućava da veći prodor svjetlosti dopre unutar krošnje; pruža odgovarajuću aeraciju krošnje s obzirom da nedovoljno prozračivanje ubrzava širenje gljivičnih bolesti, time pomažući u sveukupnom gajenju. Orezivanje tokom plodonošenja treba pažljivo planirati tako da ne bude previše intenzivno (pretjerano orezivanje) ili nedovoljno, ali se mora vršiti svake godine ili na svake dvije godine. Praksa rezanja izdanaka treba da se primjenjuje kada se rezidba vrši na svakih 4-5 ili više godina. Tokom orezivanja treba voditi računa da se ne uznemire ptice i njihova gnijezda jer maslinama pružaju prirodnu zaštitu od raznih opasnih insekata koji napadaju plodove masline. Konačno, orezivanje se mora obaviti u periodu mirovanja i poslije kasnih mrazeva. Gusta i velika stabla maslina preporučuje se da se orežu kasnije, u aprilu mjesecu, jer se ovom praksom omogućava održavanje ravnoteže između vegetativnog i reproduktivnog porasta stabala. Vodopije unutar krošnje moraju biti odstranjene tokom ljeta kako bi se izbjegla konkurencija za vodom i hranljivim materijama u odnosu sa produktivnim dijelom masline.

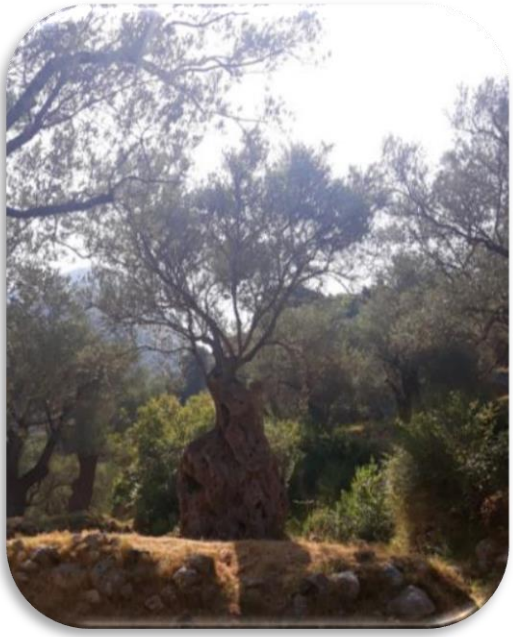
- **Redovitost rezidbe u Džidžarinu*:***
  - Dugo vremena zapušteni, neorezani maslinjaci
  - Na svake 2 do 5 godina
  - **Svake ili svake druge godine:** Iako se rezidba redovno sprovodi u većini maslinjaka u ovom kompleksu, postoji naročita potreba za smanjenjem visine stabala sa obzirom da su većina od 7 do 10 metara, čak i do 15 metara visoka. Ovo je ozbiljna restrikcija u primjeni intenzivnih poljoprivrednih aktivnosti (Fotografija 6).

GOOD FARMING PRACTICES FOR OLIVE MANAGEMENT

PRUNING

Pruning is an indispensable management practice for all olive groves and in particular for AOOs as it helps balancing the relationship between vegetative and reproductive systems, adjusts the plant to light and solar conditions easing the penetration inside the canopy; provide suitable canopy aeration since insufficient aeration accelerates the spread of fungal diseases, helps cultivation operations. Production pruning should be carefully planned not to be either too intensive (over-pruning) or too light, but it has to be carried out each year or at least every two years. The practice of cutting sucker shoots should be applied when pruning is made each 4-5 years or more. Care should be taken during pruning not to disturb the birds and their nests since they provide natural protection for the olives from various dangerous insects that attack olives. Finally, pruning has to be done during the dormancy period and after late frosts. In the case of vigorous trees, late pruning around April is advisable as this practice provides equilibrium between the growing and reproduction of the trees. Sucker branches inside the canopy have to be cut off during summer to avoid competition for water and nutrients with the productive part of the trees.

- **Frequency of pruning in *Džidžarin:***
  - Neglected for a long time
  - Performed 2 to 5 years
  - **Performed 1 to 2 years:** Even though pruning is regularly performed in most of the orchards, there is a strong need for reducing tree height since the majority of the trees is from 7 to 10 meters high, going up to 15 meters. This is a strong restriction to the implementation of intensive agriculture (Photo 6).



Uobičajena visina maslina u Baru 7-15m

OBRADA I ĐUBRENJE ZEMLJIŠTA

Odgovarajuća obrada zemljišta je izuzetno važna za pravilan uzgoj i zadovoljavajući prinos masline, ali i za održavanje i povećanje nivoa plodnosti zemljišta. Održivo upravljanje zemljištem čuva ga od erozije i pomaže u održavanju biljnog pokrivača na nagibima, time povećavajući plodnost i održavajući biodiverzitet. Osnovna pravila prilikom unošenja neophodnih hraniva đubrenjem u starim maslinjacima su prikazana u nastavku.

- **Azot** se apsorbuje tokom vegetativnog dijela sezone, ali ga treba intenzivno unositi od faze cvjetanja do faze stvrdnjavanja endokarpa;
- **Fosfor** se apsorbuje u prvom dijelu vegetativne sezone, ali su zahtjevi maslina za P_2O_5 relativno niski;
- **Kalijum** treba unositi prilikom početka buđenja, tj. pri izlasku biljke iz stadijuma mirovanja i u većim dozama tokom akumulacije ulja u plodovima.

Ordinary olive height in Bar 7-15 m

SOIL MANAGEMENT AND FERTILIZATION

Soil management is crucially important for the growing and production capacity of olives as well as for maintaining and increasing soil fertility levels. Sustainable soil management protects soil from erosion and helps maintaining the vegetation cover along the slopes, thus increasing soil fertility and conserving biodiversity. General rules for proper fertilization into AOOs are provided below.

- **Nitrogen** is absorbed throughout the growing season but should be provided intensely from blossoming to stone hardening;
- **Phosphorous** is absorbed in the first part of the growing season, but P_2O_5 requirements for olives are rather low;
- **Potassium** uptake begins with the growing recovery after the dormancy but should be used in higher doses during the oil accumulation period in the fruits.

Veoma je važno da se đubrenje dozira nakon sprovođenja analiza zemljišta, a shodno stanju stabla, dostupnoj vlažnosti zemljišta, kao i reakciji masline na hraniva unijeta đubrenjem. Uglavnom, preporučuje se za maslinjak od 278 stabala/ha (6x6 metara razmak sadnje) koji prinosi oko 41 kg/ha da se koristi oko 50 kg/ha fosfora, 170 kg/ha kalijuma i 95 kg/ha azota. Sa obzirom na to da je broj starih maslina u našim područjima manji po hektaru (oko 120 stabala), ove preporuke je potrebno prilagoditi u skladu sa tim.

Netačno je zaključiti da su zahtjevi maslina za hranivima zanemarljivi samo zato što donekle zadovoljavajuć prinos može biti ostvaren i bez unosa đubriva. Đubrenje poboljšava fizičke i hemijske karakteristike zemljišta što ima pozitivan uticaj ne samo na povećanje prinosa i kvaliteta maslinovog ulja, već takođe i na povećanje otpornosti starih stabala na relativno niske temperature, sušu, bolesti i razne štetočine.

Intenzivan rast maslina se može značajno poboljšati pravilnim režimom đubrenja. Korištenje sporo rastvorljivih đubriva u toku prvih godina razvoja u mladim maslinjacima se preporučuje. Alternativno, rastvorljiva đubriva se mogu koristiti veoma efikasno ako se unose kroz sistem za navodnjavanje. Ukoliko se đubrivo unosi samostalno, treba izvršiti njegovu primjenu prije kišnih vremenskih uslova. Mnogi maslinari na Mediteranu koriste organska đubriva i unose ih svake druge godine. Površinski sloj organskog materijala može biti životinjskog ili biljnog porijekla, ali ipak, maslinari moraju biti jako obazrivi kada se primjenjuje organsko đubrivo, jer je teško postići pravilan balans hranljivih elemenata korištenjem samo ovog tipa đubriva.

It is very important that fertilization is made based on soil analyses, the health status of the trees, and available soil moisture, as well as the tree response to fertilizers. In general, it is advisable for a plantation with 278 plants/ha (6x6 meters distance) that produce about 41 kg/ha of olives to use 50 kg/ha phosphorous, 170 kg/ha potassium and 95 kg/ha nitrogen. Since the number of trees in AOOs areas is lower (usually 120 plants/ha), these recommendations should be adjusted accordingly.

It is a wrong conclusion that the needs of olives for mineral nutrition are negligible just because certain yields may be obtained without fertilization. Fertilization improves the properties of soil, physical and chemical, which has a positive impact not only on yield increase and quality of olive oil but also on increasing its resistance to relatively low temperatures, droughts, diseases, and pests.

The intensive growth of olive trees will be significantly improved with the proper fertilization regime. The use of slow-release fertilizer during the first years of development of new plantations is recommended. Alternatively, soluble fertilizers can be used with high efficiency, especially through the irrigation system. If the fertilizer is applied separately, it should be ensured that after fertilization use is carried out before the rain. Numerous growers in Mediterranean countries apply organic fertilizers every second year. The surface layer of organic material can be fertilized from livestock or food remains, but growers should carefully use it because it is difficult to achieve a good balance of nutritive elements only with this method of fertilization.

Veoma je važno izbjegavati postavljanje mineralnog ili stajskog đubriva u gomilama kod stabala. Bez obzira na to koja se vrsta đubriva koristi, najbolja metoda je da se dodaje u manjim količinama i češće tokom vegetacione sezone. Treba izbjegavati upotrebu rastvorljivih đubriva koja mogu oštetiti biljku i isprati se u podzemne vode. Količina primjene mineralnog đubriva treba da se zasniva na prinosu, apsorpciji hranjivih sastojaka, analizi zemljišne i folijarne ishrane i simptomima na listu, eksperimentalnim pokazateljima i kretanju hraniva.

Način i vrijeme đubrenja – Najveća masa maslinovog korijenovog sistema je na dubini od 15 do 20 cm. Stoga, preporučljivo je da se kalijum i fosfor, kao slabo pokretljivi elementi, unose dublje u zemljište prilikom obrade, u količini od oko 400 do 500 kg/ha superfosfata i isto toliko kalijum fosfata, u zavisnosti od rezultata agrohemijske analize zemljišta.

Kasnije, tokom regularnog sprovođenja agrotehničkih mjera, ova đubriva treba unijeti u zemljište na svakih 5 do 6 godina, na dubini od 20 do 30 cm.

Azot se dodaje tokom perioda uzgoja sadnice u količini od oko 30 grama po sadnici u prvoj godini, oko 70 grama po sadnici u drugoj godini, u trećoj oko 120 grama i u četvrtoj oko 170 grama. Nakon četvrte godine, količina azota koja se dodaje se izračunava na bazi prinosa u toj godini, ali shodno dostupnoj literaturi, preporučuje se dodavanje od 2 do 2,8 kg po hektaru azota na svakih 100 litara proizvedenog maslinovog ulja. Azot se koristi površinski ili se unosi plitkom obradom, i to u dva navrata: 50% na kraju februara i 50% krajem marta.

Potrebe intenzivne masline koja je u punom proizvodnom potencijalu iznose 150 do 250 kg/ha azota, 60 do 80 kg/ha fosfora (P2O5) i od 100 do 200 kg/ha kalijuma (K2O), dok je za osnovno đubrenje odnos elemenata 1:2:3.

It is always very important to avoid placing fertilizer or manure in the trunk. No matter which type of fertilizer should be used, the best method is to add it in smaller quantities and more often during the growing season. Avoid abundant use of soluble fertilizers that can damage the plant and leaching into groundwater. The amount of mineral fertilizer application should be based on the yield, nutrient absorption, soil nutrition analysis, leaf nutrition analysis, leaf symptoms, experimental fertilizer results, and nutrition recycling.

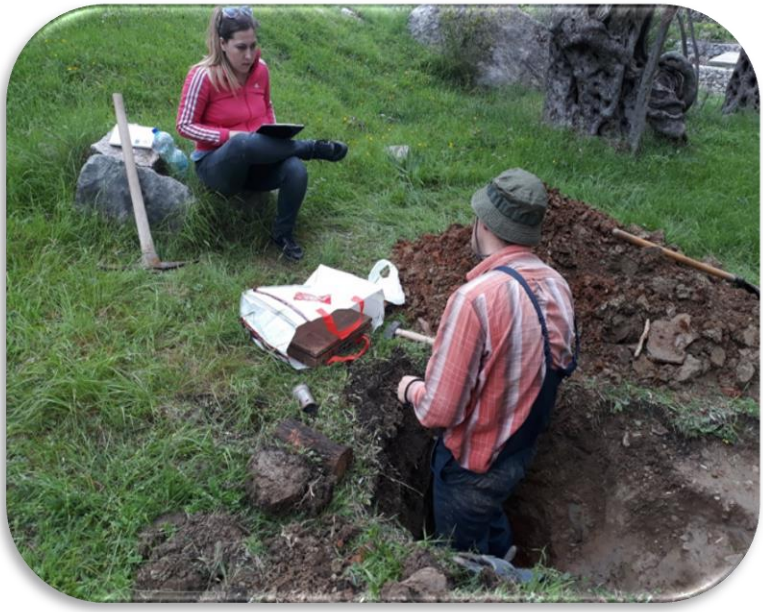
Methods and time of fertilization – The largest amount of olives' root system mass is located from 15 to 20 cm. Therefore, it is recommended that potassium and phosphorous fertilizers, as slowly mobile, be applied during deep soil cultivation, in approximately 400-500 kg/ha of superphosphate and potassium phosphate, depending on the agrochemical soil analysis.

Later, during regular agro-technics, these fertilizers should be introduced into the soil at the same amount every 5-6 years, at a depth of 20-30 cm.

Nitrogen is added in the breeding period with the amount of 30 g/seedling in the first year, 70 g/seedling in the second year, 120 g/seedling in the third year, and 170 g/seedling in the fourth year. After the fourth year, the amount of nitrogen to be added is calculated based on yield in that year, but as literature states, for every 100 liters of olive oil, 2.0 - 2.8 kg/ha of nitrogen should be added. Nitrogen is applied by the surface or with shallow cultivation and is added on two occasions: 50% at the end of February and 50% at the end of March.

The need for intensive olive-growing plants of full-grown olive is 150 to 250 kg/ha nitrogen, 60 to 80 kg/ha of phosphorus (P_2O_5), and 100 to 200 kg/ha of potassium (K_2O), while for basic fertilization, needed nutrition ratio is 1:2:3.

U maslinjaku Džidžarin, agrohemijske analize zemljišta su pokazale da aplikacija đubriva u teorijskom smislu nije uvijek jednostavna za primijeniti u praksi.



Zemljišni profil u Džidžarinu

Shodno klasifikaciji zemljišta na osnovu pH u KCl-u, zemljišna reakcija se može smatrati neutralnom. Sadržaj kalcijum-karbonata se povećava sa dubinom, i na osnovu sadržaja kreča ovo zemljište prelazi iz srednje obogaćenog u vrlo bogato. Sadržaj organske materije opada sa dubinom, što je u skladu sa prethodnim saznanjima. Zemljište je veoma humično samo u tankom površinskom sloju, a zatim je vrlo siromašno humusom.

Tanak površinski sloj, koji zapravo predstavlja travnati pokrivač, karakteriše se visokim nivoom lako rastvorljivog fosfora i kalijuma. Nakon toga, sadržaj hraniva značajno opada u narednom horizontu, kada je zemljište veoma siromašno fosforom i srednje obogaćeno kalijumom. Na dubini većoj od 30 cm, uočava se nizak sadržaj lakopristupačnih fosfora i kalijuma.

In the *Džidžarin* olive orchard, agrochemical soil analyzes were conducted indicating that the theoretical application mentioned above is not always easy to apply.

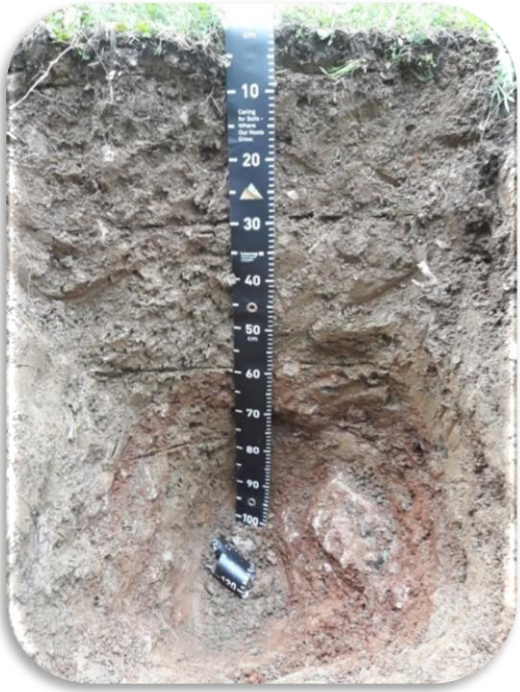


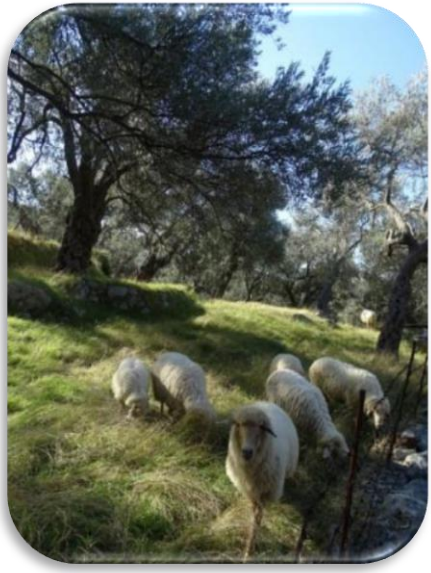
Photo 7: Soil* profile in *Džidžarin

Based on the classification of soil according to the pH in KCl, the soil may be characterized by a neutral reaction. $CaCO_3$ content increases with depth and medium lime transition to very lime. The content of organic matter, as usual, decreases with depth. It is very *humic* only in a thin surface layer and then poorly *humic*, while in the lowest layer is very poorly *humic*.

The thin surface layer, which represents a grass bush, is characterized by the high content of easily available phosphorus and potassium. The content then falls significantly in the following layer, where the soil is poorly provided with phosphorus and averagely provided with potassium. At depths over 30 cm, the soil is poorly available with elements.

Imajući u vidu starost stabala, jasno je da odgovarajuća priprema zemljišta nije izvršena u vrijeme sadnje, kao što je duboka obrada i unošenje đubriva do dubine zemljišnog profila. Usljed izdijeljenosti parcela i specifične konfiguracije terena, korištenje navodnjavanja i fertirigacija bez adekvatnog meliorativnog projekta nije ni moguća ni isplativa.

Za lokacije kao što je Džidžarin, preporučuje se prihrana osnovnih hraniva injektiranjem, kao i dodavanje mikroelemenata kroz folijarnu aplikaciju.

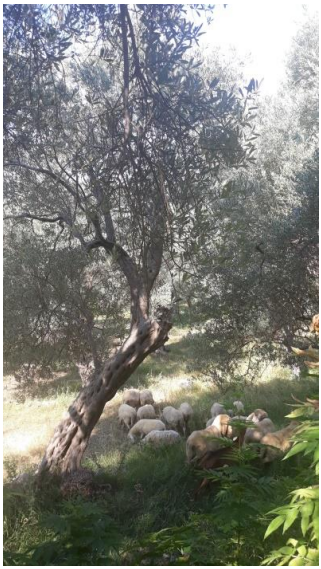


Ovčarstvo kao jedna od najboljih maslinarskih praksi u *Džidžarinu* /
Sheep farming as one of the best practice examples in *Džidžarin*

Jedan od najboljih primjera poljoprivrednih praksi je **ovčarstvo.** Veoma je preporučljivo da stada ovaca budu prisutna u maslinjacima iz razloga što održavaju biljni pokrivač i preventivno djeluju na šumske požare jer se hrane najbrže zapaljivim, srednjim rastinjem. Takođe, dokazano je da se hrane inficiranim plodovima masline (Muva masline).

Bearing in mind the age of the trees, it's clear that no suitable soil preparation was possible at that time, such as deep cultivation and placement of the fertilizer at the depth part of the soil profile. Due to the fragmentation of the plots and the configuration of the terrain, the application of irrigation and its mixing with fertilizers without an adequate amelioration project is neither possible nor economic.

For locations such as *Džidžarin,* it is recommended to feed basic nutrition by injection and addition of microelements through foliar application.



Ovčarstvo kao jedna od najboljih maslinarskih praksi u Džidžarinu / Sheep farming as one of the best practice examples in *Džidžarin*

One of the best practice examples – **sheep farming**. It is strongly advisable that sheep flock be present in olive orchards since they maintain herb canopy, prevent fires by eating middle-size shrubs, considered to be highly flammable, and eat the olive fruit contaminated by Olive fruit fly pest.

Tabela 3: Agrohemijske analize zemljišta u *Džidžarinu*

Dubina	pH		$CaCO_3$	Humus	P_2O_5	K_2O
cm	H_2O	KCl	%	%	mg/100g zemljišta	
0–6	7,65	7,08	8,5	7,87	57,6	39,1
6–29	7,7	7,16	10,8	2,96	3,6	14,9
29–59	7,48	6,9	16,1	1,45	1,4	7,4
59–78	7,61	6,99	14,2	1,13	0,7	8,9
78–100	7,58	6,95	11,8	0,96	1,2	8,2

Tabela 4: Meliorativne aktivnosti u *Džidžarinu*

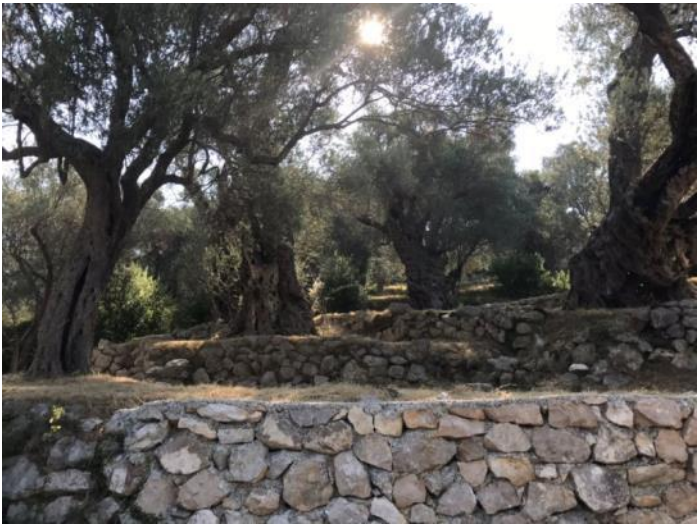
POLJOPRIVREDNA PRAKSA	
Učestalost đubrenja u toku sezone	1–2 puta
Tip đubriva	Organsko đubrivo i NPK mineralna đubriva
Aplikacija zelenišnog đubriva kroz leguminozni pokrivač	Ne koristi se
Orezane grane koriste se kao izvor hraniva	Ne koriste se
Maslinjaci zaštićeni teresama	Da, najčešće izdužene, ali nekada i polukružnog oblika
Košenje korova svake sezone	Da, nekoliko puta
Korištenje malča	Ne koristi se
Obrada zemljišta	Jesen: obrada na 30–60 cm dubine; rano proljeće: plitka obrada zemljišta
Zemljišne analize u cilju provjere plodnosti	Rijetkost u starim maslinjacima, redovno u mladim (Biotehnički fakultet u Podgorici)
Navodnjavanje u maslinjacima	Samo u mladim maslinjacima, mikro-irigacioni sistemi („kap po kap“)

Table 3: Agrochemical soil analysis in *Džidžarin*

Depth	pH		$CaCO_3$	Humus	P_2O_5	K_2O
cm	H_2O	KCl	%	%	mg/100g soil	
0-6	7.65	7.08	8.5	7.87	57.6	39.1
6-29	7.7	7.16	10.8	2.96	3.6	14.9
29-59	7.48	6.9	16.1	1.45	1.4	7.4
59-78	7.61	6.99	14.2	1.13	0.7	8.9
78-100	7.58	6.95	11.8	0.96	1.2	8.2

Table 4: Soil management activities in *Džiždarin*

AGRONOMIC PRACTICES	
Frequency of fertilization each growing season	1-2 times
Form of fertilization	Organic manure and NPK fertilizer
Application of green manure by planning legume cover crops	Not used
Chopped pruning branches used as fertilization sources	Not used
Olive groves protected by terraces	Yes, often elongated and sometimes semi-circle
Weeds cut each season	Yes, few times
Application of mulching	Not used
Implementation of tillage	Autumn: tillage on 30-60 cm depth; Early spring: Shallow soil conservation
Soil analysis to check soil fertility	Rare in ancient grooves; regularly in young orchards (soil analysis at Biotechnical Faculty)
Irrigation of olive trees	Only in young orchards, micro-irrigation systems ("drop by drop")

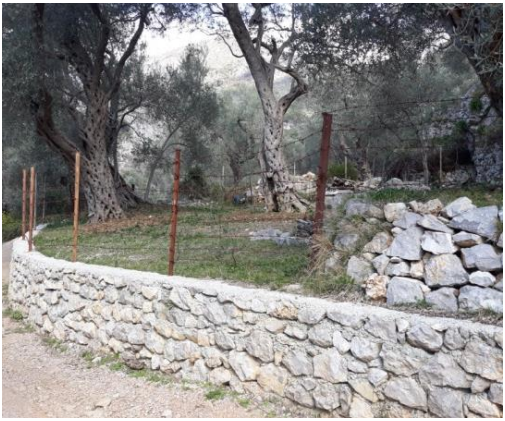
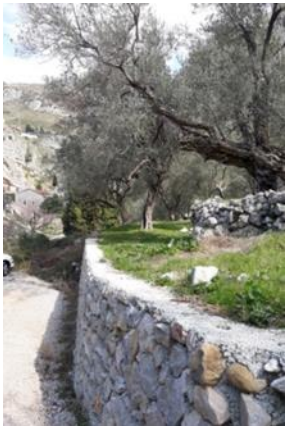


Terasiranje, od davnina poznata anti-eroziona mjera

ZAŠTITA OD BOLESTI I ŠTETOČINA

Masline su podložne napadu brojnih patogena i štetočina. Najčešće su: Muva masline *(Bactrocera oleae)*, Maslinin moljac *(Prays oleae Bem)*, Maslinin medić *(Saissetia oleae)*, Paunovo oko *(Spilocea oleagina)* i drugi. Sa druge strane, održavanje balansa između korisnih insekata koji borave u obližnjoj vegetaciji i agro-biodiverziteta je krucijalna u promociji pravilnog („prijateljskog") načina borbe protiv štetočina i patogena koji negativno utiču na masline.

- Zaštita od bolesti i štetočina u ***Džidžarinu***:
  - **Koji tip tretmana se koristi u borbi protiv bolesti i štetočina?** Najveći problem u gajenju starih maslina je njihova zaštita. Ona se sprovodi u zanemarljivom obimu, dok je šteta od muve masline i drugih bolesti i štetočina veoma velika. Prije desetak godina, zaštita maslina vršena je avionskim prskanjem i kvalitet i kvantitet maslina i maslinovog ulja je bio značajno bolji.

Elongated and semi-circle terraces

PEST AND PATHOGEN MANAGEMENT

Olives are vulnerable and susceptible to numerous pests and diseases. The most common are Olive fly *(Bactrocera oleae)*, Olive moth *(Prays oleae Bem)*, Olive black scale *(Saissetia oleae Olivier)*, Peacock's Eyes *(Spilocea oleagina),* and others. On the other side, maintaining a good balance between beneficial insects that reside in the nearby vegetation and agro-biodiversity is crucial to promote a friendly way of pest and pathogen management.

- Pest and pathogen management in ***Džidžarin***:
- **What type of treatment is implemented to combat pests and diseases?** A major problem in the cultivation of old olive trees is their protection. It is carried out to a negligible extent, and damage to olive flies and other diseases and pests is very high. For several years in the past, airplane protection of olives was carried out and the quality and quantity of olive and olive oil was significantly better.

Međutim, zbog zagađenja životne sredine, ova praksa je napuštena i maslinari samostalno sprovode zaštitu; međutim, ne vrše redovnu zaštitu najviše zbog slabo pristupačnog terena za pristup mehanizacije. Kako je Muva masline *(Bactrocera oleae)* najopasnija štetočina za lokalne maslinare koja desetkuje prinose, svake godine se *Mc Phail* klopke i žute table postavljaju sa ciljem praćenja ovog insekta. Pažljivim monitoringom i u konsultaciji sa nacionalnim institucijama (Biotehnički fakultet i Ministarstvo poljoprivrede, šumarstva i vodoprivrede), obavještenja se dostavljaju maslinarima u vidu preporuka kako da efikasno i uspješno obave zaštitu u ovom području koristeći hemijska sredstva *(Imidan 50 WG*, *Perfektion*, *Cromogor*, *Buminal).*

BERBA MASLINA

Berba maslina mora da bude sprovedena praćenjem toka sazrijevanja ploda, kako bi se ostvario najbolji kvalitet maslinovog ulja. Uopšteno govoreći, rana berba dovodi do proizvodnje zelenog maslinovog ulja sa visokim nivoom gorčine i pikantnosti usljed značajnog sadržaja fenola. Kasna berba rezultuje uljem žute boje koje je manje gorko i ukusnije za većinu konzumenata. Ipak, postoje različita razmatranja koja treba uzeti u obzir prilikom određivanja momenta berbe, uključujući sortu masline i klimatske karakteristike. U slučaju kasnog napada muve masline, preporučuje se da odmah započne berba kako bi se preduhitrilo smanjenje količine i kvaliteta ulja. Načini berbe su jako važni kako bi se izbjegli udari i oštećenja ploda masline, što loše utiče na proizvodnju u narednoj godini. Plodovi maslina moraju da ostanu neoštećeni i po pravilu, trebaju se prikupiti sa stabla, a ne nakon pada na zemlju. Jako je važno da plod masline bude što prije donešen do mlina nakon berbe.

- **Berba maslina u Džidžarinu:**
  - Ručno: Da, najčešće
  - Ručnim oruđem za berbu: Da, kao pomoćni alat
  - Mehaničkim tresačima: Ne

- Traktorski vučenim tresačima: Ne

However, due to environmental pollution, this protection is abandoned, and the owners themselves perform protection, however, not regularly due to poorly accessible terrain for mechanization. Since the *Olive fruit fly* is the most dangerous pest for the local olive growers, each year *Mc Phail* traps and yellow plates are used for monitoring the insects. After precise monitoring and consultation with national institutions (Biotechnical Faculty and Ministry of Agriculture, Forestry and Water Management), notifications are sent to the farmers with recommendation on how to efficiently and successfully combat the main pests in our area, by using chemical protection *(Imidan 50 WG, Perfektion, Cromogor, Buminal)*.

OLIVE HARVESTING

Harvesting time must coincide with the ripening of the fruits to produce the very best quality of olive oil. Generally speaking, early harvesting produces green color oil with a higher level of bitterness and pungency due to a high level of phenol content. Late harvesting results in oil yellowish in color but less bitterness and tastier for many consumers. Hence, there are various considerations to be taken into account when establishing the right moment to harvest, including olive varieties and climatic conditions. In case of late attacks by the olive fly, it is advisable to anticipate the harvesting to avoid both oil quality and quantity reduction. Harvesting methods are very important to avoid bruising and damaging of olive fruits compromising the production of the coming year. Olive fruits have to remain undamaged and should be collected without touching the ground and to be brought soon after the harvest at the oil mill.

- **Olive harvesting in *Džidžarin:***
  - By hand: Yes, mostly
  - By harvest tools: Yes, as auxiliary tools
  - By mechanical shakers: No
  - By tractor shakers: No

KALENDAR RADOVA U MASLINJAKU

KALENDAR RADOVA		
MJESEC	**AGROTEHNIČKA MJERA**	**POJAVA BOLESTI I ŠTETOČINA**
Januar	Rezidba je dozvoljena samo tokom bezkišnog perioda; pripremni radovi za podizanje zasada; đubrenje samo ako nije sprovedeno prethodne godine nakon berbe	Štitasta vaš (*Hemiptera*, *Sternorrhyncha*) Paunovo oko *(Spiloceae oleagineae)*
Februar	Sadnja, rezidba i/ili podmlađivanje stabala samo tokom suvih i toplijih dana; površinska obrada zemljišta se preporučuje	Paunovo oko *(Spiloceae oleagineae)*
Mart	Mart je pravo vrijeme za sadnju, rezidbu, obradu, đubrenje i sve druge agrotehničke radove.	Paunovo oko *(Spiloceae oleagineae)* Čađavica *(Capnodium elaeophilum)*
April	Ožiljavanje može početi od 20-og aprila, kao i đubrenje i zaštita od korova.	Potkornjak (*Hylesinus oleiperda)* i Svrdlaš *(Hynchites cribripennis)*

CALENDAR OF WORKS TO BE IMPLEMENTED IN ORCHARDS

CALENDAR OF WORKS TO BE IMPLEMENTED IN ORCHARDS		
MONTH	**AGRO-TECHNICAL MEASURES**	**PESTS AND DISEASES OCCURRENCE**
January	Pruning is allowed only during the dry period; preparatory works for new plantation; fertilization only if it was not done last year after harvesting	Scale insects (*Hemiptera*, *Sternorrhyncha*) Peacock spot *(Spiloceae oleagineae)*
February	Planting, pruning, and/or olive tree rejuvenation only during the warm and dry period; shallow soil tillage is recommended	Peacock spot *(Spiloceae oleagineae)*
March	March is the right time for planting, pruning, tillage, fertilization, and other agro-technical works	Peacock spot *(Spiloceae oleagineae)* Sooty mold of olive *(Capnodium elaeophilum)*
April	Grafting can start from April 20th, fertilization and weed protection is recommended	Olive bark beetle (*Hylesinus oleiperda)* Olive fruit Curculio *(Hynchites cribripennis)*

Maj	Ožiljavanje od 20-og aprila; iniciranje navodnjavanja ako se pojavi sušni period; monitoring cvjetanja za primjenu fertirigacije; drugo prihranjivanje treba sprovesti kada je otvoreno do 10% cvjetova.	Paunovo oko *(Spilocea oleaginea)* Čađavica *(Capnodium elaeophilum)*
Jun	Površinska priprema i navodnjavanje. Treće prehranjivanje kada je 70% cvjetova otvoreno, četvrto sa otvaranjem 100% cvjetova i peto kada je plod veličine zrna pšenice.	Maslinov moljac (Prays oleae), Štitasta vaš (order *Hemiptera*, suborder *Sternorrhyncha*)
Jul	Odstranjivanje nepotrebnih zelenih grana; navodnjavanje i folijarna prihrana.	Muva masline I generacije na kraju mjeseca *(Bactrocera oleae)*
Avgust	Navodnjavanje po potrebi sa folijarnom prihranom; površinska obrada u cilju očuvanja zemljišne vlage se preporučuje.	Muva maslihne II generacija *(Bactrocera oleae)*
Septembar	Odstranjivanje zelenih grančica; dodavanje organskog đubriva ako nije bilo obilne kiše u prethodnom periodu.	Muva maslihne III generacija *(Bactrocera oleae)* Paunovo oko *(Spilocea oleaginea)*
Oktobar	Berba maslina i prerada u ulje; rezidba, đubrenje, dezinfekcija stabala	Muva masline *(Bactrocera oleae)*
Novembar	Berba maslina i dodatak organskog đubriva	Paunovo oko *(Spilocea oleaginea);* Medić *(Saissetia oleae)*
Decembar	Berba kasnih sorti; rezidba; duboka obrada, dodavanje organskog đubriva; priprema za sadnju.	Paunovo oko *(Spilocea oleagina)*

May	Grafting from April 20th, the initial start of irrigation if water scarcity occurs; monitoring of flowering for foliar fertigation and nutrition; second nutrition should be implemented when 10% of flowers are open.	Peacock spot (Spilocea oleaginea) Sooty mold of olive (Capnodium elaeophilum)
June	Soil tillage and irrigation. Third nutrition when 70% of flowers are open, fourth with 100% of open flowers and fifth time when olive fruit is the size of wheat grain	Olive moth (Prays oleae), Scale insects (order *Hemiptera*, suborder *Sternorrhyncha*)
July	Removal of unnecessary green branches; irrigation and foliar nutrition	Occurrence of the first generation of Olive fruit fly *(Bactrocera oleae)* at the end of the month
August	Irrigation when needed together with foliar nutrition; shallow tillage recommended for preservation of soil humidity	Olive fruit fly *(Bactrocera oleae)* of the second generation
September	Removal of green branches; addition of organic manure if there was no heavy rain in the previous period	Olive fruit fly *(Bactrocera oleae)* of the third generation; Peacock spot *(Spilocea oleaginea)*
October	Olive harvesting and olive oil processing Pruning, fertilization; trunk disinfection	Olive fruit fly *(Bactrocera oleae)*
November	Olive harvesting and adding the manure	Peacock spot *(Spilocea oleaginea);* Black scale *(Saissetia oleae)*
December	Harvesting of late olive species; pruning; deep soil tillage; adding the manure; preparation for planting	Peacock spot *(Spilocea oleagina)*

ZAKLJUČCI

Uprkos velikom broju izazova, najvažniji potencijali Crne Gore ostaju povoljni agroekološki uslovi, duga tradicija maslinarstva, autohtone sorte maslina, povećano interesovanje mladih ljudi za proizvodnju maslina i razne vidove prerade, komplementarnost sa turizmom i značajan potencijal za sprovođenje organske proizvodnje. Međutim, nedostaci u vidu fragmentacije parcela, neorganizovanosti tržišta, neadekvatnog nivoa znanja i nespremnosti na investicioni rizik uveliko ograničavaju ubrzani razvoj maslinarstva. Postoji očigledna potreba za promjenom svijesti svih zainteresovanih strana (npr. proizvođača, nadležnih organa, potrošača, medija itd.) u pogledu modernog i održivog uzgoja maslina. Nesumnjivo, u tom pravcu su napravljeni pionirski koraci, a maslinarstvo u Crnoj Gori u posljednjoj deceniji bilježi pozitivan trend u pogledu sadnje novih stabala, obnove starih maslinjaka i povećanja proizvodnje maslina i maslinovog ulja. Takođe, pojačan je rad na planu obrazovanja kako proizvođača, tako i potrošača, što šalje ohrabrujuće signale za budućnost maslinarstva u Crnoj Gori.

*Vlada Crne Gore investira skoro milion eura za konstrukciju **Kuće maslina**, smještene u Starom Baru. Ovaj objekat će biti opremljen pogonom za preradu maslina i izložbenim prostorijama, pogodnim za držanje prezentacija i u turističke svrhe. Služiće i kao sjedište za Nacionalno udruženje maslinara.*

CONCLUSIONS

Despite the great number of challenges, the most important potentials of Montenegro remain favorable agro-ecological conditions, a long tradition of olive growing, autochthonous varieties of olives, increased interest in olive production, and olive products, complementarity with tourism, and great potential for organic production. However, weaknesses such as fragmentation of the plots, market disorganization, inadequate level of knowledge, and unwillingness for investment risk greatly limit the accelerated development of olive growing. There is an evident need for changing the awareness of all the stakeholders (e.g. producers, competent authorities, consumers, media, etc.) for modern sustainable olive growing. Undoubtedly, pioneer steps are made in this direction and Montenegrin olive growing in the last decade experienced a positive trend (planting new olive trees, restoring old ones, and increasing production of olives and olive oil). Also, work is intensified in terms of education for both producers and consumers, which are encouraging signals for the future of olive growing in Montenegro.

Government of Montenegro will invest almost one million euros for the construction of ***House of olives*** *located within the Old Bar. This facility will be equipped with processing units and exhibition areas, suitable for presentations and tourist purposes. It will serve as a centre for National Associations of olive growers.*

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