# Current status of wild grape populations (Vitis vinifera subsp. sylvestris) in Croatia

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# **Content of presentation:**

- ✓ Literature records about wild grape in Croatia
- ✓ Current status, projects and results
- ✓ Future directions and conservation

#### First written records in Croatia since 1879

Vinarsko zelce, Vinarsko žleže, Lysimachia Nummul. L. (Frey.). Vinena tikva, Cucurbita Lagenaria L. (Nov.). Vinerski zelce (Bl.), v. Vinarsko zelce. Viničevina (Zag.), Viničina (Kalnik), v. Vinika. Vinik (= phoenix, gove), palma (Stulli), Phoenix dactylifera L. Vinika, Vitis vinifera silv. Gmel. (Vis. Freyer, Jambr.), v. Vinjaga. Vinoboja, Phytolacca decandra L. (Pané.). Vinoloza (Vukas.), Vinova loza, rus. виноградъ, polj. winorosl, češ. vinuý kmen. Vitis vinifera L. (Vuk, Panč.). (Voda od vinove loze dobra je ženskinju za kosu, raste od toga. Milić.). (Sadila Mara vinograd i bielu lozu vinovu. Nar. pj. Vuk). (Zagonetke: Lipa krava lipova, otelila liepa sina a manita unuka. Vuk. Otac kotac, mati dropljuša, sitna djeca, al obiesna. Slav.).

Šulek (1879.), Croatian names: "vinika" or "vinjaga"

# **Bible translations into Croatian**

Book of Isaiah (5, 1-7) Croatian: "Nadao se da će uroditi grožđem, ali urodi vinjagom"

English: "He expected to yield fine grapes: wild grapes were all it yielded"





#### Fra Bernardin Splićanin (1495) "vinjaga"

### Description of wild grape from Herzegovina

- Male and female individuals
- Blue-black color of berry skin
- Low weight of clusters 3.5 33 (g)
- 100 berries weight 43.81 (g)
- Total titratable acidity 17.1 (g/L)
- Etanol in wine 10.13 (vol.%)

Turković i Aničić-Bošnjak (1953.) Turković i Sučević-Šafar (1953.) AGRONOMSKI GLASNIK

ration 20. Statisti - produce 200, Mary 21-2

ZIMNKO TURKOVEC - DIE OLGA NUCEVIC-SAFAR.

#### Analize Vitis silvestris

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Prov opeidne analise see podenie involene se u Zavadu za vinaprodastvo i vinantite u Zaprén pod rodinem za, Olge Baleviebećar, koja je ujedno isradilu i tementar podataza nevedenih u sletihujet.

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#### Description of wild grape from Herzegovina





Turković i Sučević-Šafar (1953.)

# **Current** activities

- Projects to investigate wild grape:
- 2013-2015 Conservation of wild grape in Croatia and Bosnia and Hercegovina supported by Critical Ecosystem Partnership Fund (CEPF)
- 2015 Research of wild grape supported by Croatian Science Foundation



# **Project approach**

- Research expedition locating the natural populations of wild grapes along rivers and lakes
- GPS coordinates
- Morphology identification according to standard international descriptors (OIV, 2001)
- Plant communities description
- Identification of current threats and highlight of hotspot areas for this species
- SSR markers (distributed along 19 chromosomes) (Laucou et al. 2011)
- Chloroplast DNA markers (Arroyo-Garcia et al. 2006)
- Anthocyanin profiles
- Disease resistance (REN1 locus, Hoffmann et al. 2008)
- APT3 Indel; VVIB23 flower type
- Mycorrhiza AMF communities sequencing 18S ITS region rDNA



# **Distribution of wild grape**



# Morphology evaluation











#### **Flower type**

Male

Female



# **Cluster dimensions of wild grape**

|                         |      | Gizdavac<br>(n=136) | Paklenica<br>(n=32) | Imotski<br>(n=55) | Neretva<br>(n=168) |
|-------------------------|------|---------------------|---------------------|-------------------|--------------------|
| Cluster length (cm)     | Mean | 12.5                | 7.5                 | 9.2               | 8.9                |
|                         | SD   | 3.3                 | 1.8                 | 2.7               | 2.1                |
|                         | Min  | 5.6                 | 3.9                 | 4.6               | 4.6                |
|                         | Max  | 21.3                | 11.2                | 15.4              | 14.3               |
| Cluster width (cm)      | Mean | 5.3                 | 3.6                 | 5.7               | 4.6                |
|                         | SD   | 1.7                 | 1.0                 | 1.8               | 1.3                |
|                         | Min  | 1.2                 | 1.6                 | 2.3               | 2.4                |
|                         | Max  | 11.2                | 6.4                 | 9.8               | 8.2                |
| Cluster weight (g)      | Mean | 10.9                | 6.0                 | 15.9              | 7.3                |
|                         | SD   | 6.1                 | 6.1                 | 7.5               | 4.9                |
|                         | Min  | 1.1                 | 0.7                 | 2.6               | 1.4                |
|                         | Max  | 31.4                | 28.1                | 28.6              | 24.9               |
| Rachis fresh weight (g) | Mean | 1.0                 | 0.6                 | 2.1               | 0.7                |
|                         | SD   | 0.5                 | 0.5                 | 1.0               | 0.3                |
|                         | Min  | 0.1                 | 0.1                 | 0.1               | 0.19               |
|                         | Max  | 2.2                 | 2.7                 | 4.1               | 2.0                |
| Berries weight (g)      | Mean | 9.7                 | 5.4                 | 13.8              | 6.5                |
|                         | SD   | 5.6                 | 5.7                 | 6.7               | 4.6                |
|                         | Min  | 0.9                 | 0.5                 | 1.3               | 0.95               |
|                         | Max  | 28.9                | 25.5                | 25.3              | 22.7               |
| Number of berries       | Mean | 21                  | 10                  | 30                | 20                 |
|                         | SD   | 11                  | 11                  | 17                | 13                 |
|                         | Min  | 2                   | 1                   | 2                 | 3                  |
|                         | Max  | 60                  | 60                  | 62                | 82                 |

#### Neretva



### Modro jezero







#### Gizdavac



#### Krka



#### Paklenica



#### Psunj





#### Genetic relationship among wild, cultivated grapes and rootstocks



based on 21 SSR loci and –In proportion of shared alleles distance matrix

### **Project impact and future directions**

- Conservation of genetic variability
- Ex situ collection of wild grape at Institute
- Natural habitat, ecology what we can learn from wild grape for commercial production – technology - understanding of adaptability and survival of wild grape
- Source of genetic variability for breeding: resistance to diseases and pests, tolerance to biotic and abiotic stresses
- Enology, pharmacology: wild grape as a source for color, acidity, aromas...



