

WG1: Mushrooms & truffles

COST Action FP1203

José-Antonio Bonet
(20/02/2014)



Main Goal of the COST action

- Establishing an European NWFPs network:
 - reviewing current knowledge;
 - highlighting existing innovation;
 - **sharing information;**
 - identifying research gaps;
 - **seeking research synergies;**
 - **consolidating European knowledge about NWFP ecology, modeling, management and economics;**
 - promoting the sustainable management of NWFPs



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Expected Outcomes of the COST action

1. Database of European NWFPs: prototype.
2. Database of European NWFPs stakeholders: prototype
3. Proceedings of an international conference in the final year;
4. Book “Sustainable management of European NWFPs”
5. Protocols for data acquisition, surveying strategies, methodologies for modeling and guidelines for management.
6. Papers, review papers, reports, book contents to be agreed by the MC by proposal of WGs and TFs
7. Engaging ESRs on NWFPs through Training Schools and STSMs



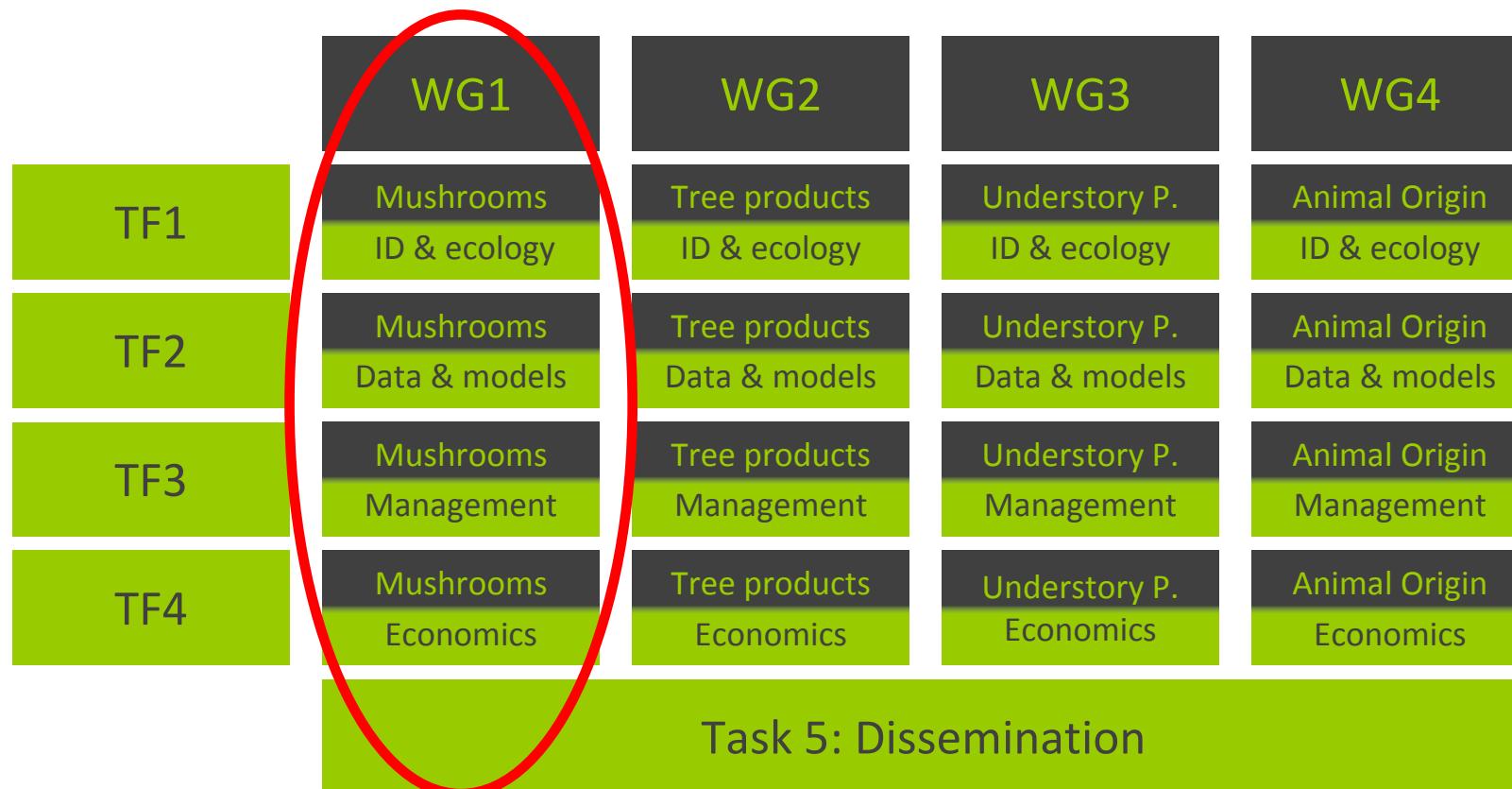
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Organisational matrix

	WG1	WG2	WG3	WG4
TF1	Mushrooms ID & ecology	Tree products ID & ecology	Understory P. ID & ecology	Animal Origin ID & ecology
TF2	Mushrooms Data & models	Tree products Data & models	Understory P. Data & models	Animal Origin Data & models
TF3	Mushrooms Management	Tree products Management	Understory P. Management	Animal Origin Management
TF4	Mushrooms Economics	Tree products Economics	Understory P. Economics	Animal Origin Economics
	Task 5: Dissemination			

Organisational matrix



DESIGN A COMMON QUESTIONNAIRE

Schedule

- **14:15-14:20:** Mikko Kurtila ([Finland](#))
- **14:20 -14:25:** Miroslav Kovalcik ([Slovakia](#))
- **14:25 -14:30:** Paweł Staniszewski ([Poland](#))
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- **15:10 -15:15:** José Antonio Bonet (on behalf of Simon Egli) ([Switzerland](#))
- **15:15 -15:20:** Fouad Mounir ([Morocco](#))
- **15:20 -15:25:** Davide Pettenella ([Italy](#))
- **15:25 - 16:00:** General discussion



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Mushrooms & Truffles in Finland

NWFPs NETWORK Meeting Krakow

Mikko Kurttila, Jari Miina, Kauko
Salo & Veera Tahvanainen

Most common mushrooms in Finland

- Officially 31 commercial mushroom species 26 mycorrhizal, 3 saprophytes, 2 of them can be both.
- The most important species are:
 - ceps (*Boletus edulis* and *B. pinophilus*)
 - chanterelle (*Cantharellus cibarius*)
 - trumpet-shape chanterelle (*C. tubaeformis*)
 - milk caps (*Lactarius spp.*)
 - russulas (*Russula spp.*)

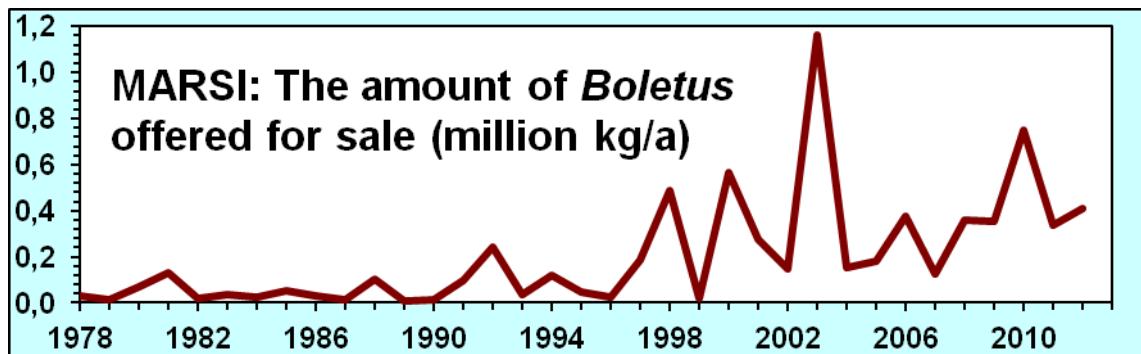


Yield and utilization

- Average annual biological yield of edible mushrooms 1200 million kg; pickable yield 270 million kg, of which about 5 % is utilised.
- The annual value of the most important species is over 20 million euro.
- Mushrooms are side-products: the value is 1 % of annual cuttings.
 - No silvicultural prescriptions for improving mushroom yields.
- This resource is currently under-utilised. More mushrooms could be picked, processed and traded in Finland → increased value added.

Statistics in Finland

- MARSI official annual statistics on berries and mushrooms bought by organised trade and industry (Mavi – Agency for Rural Affairs).



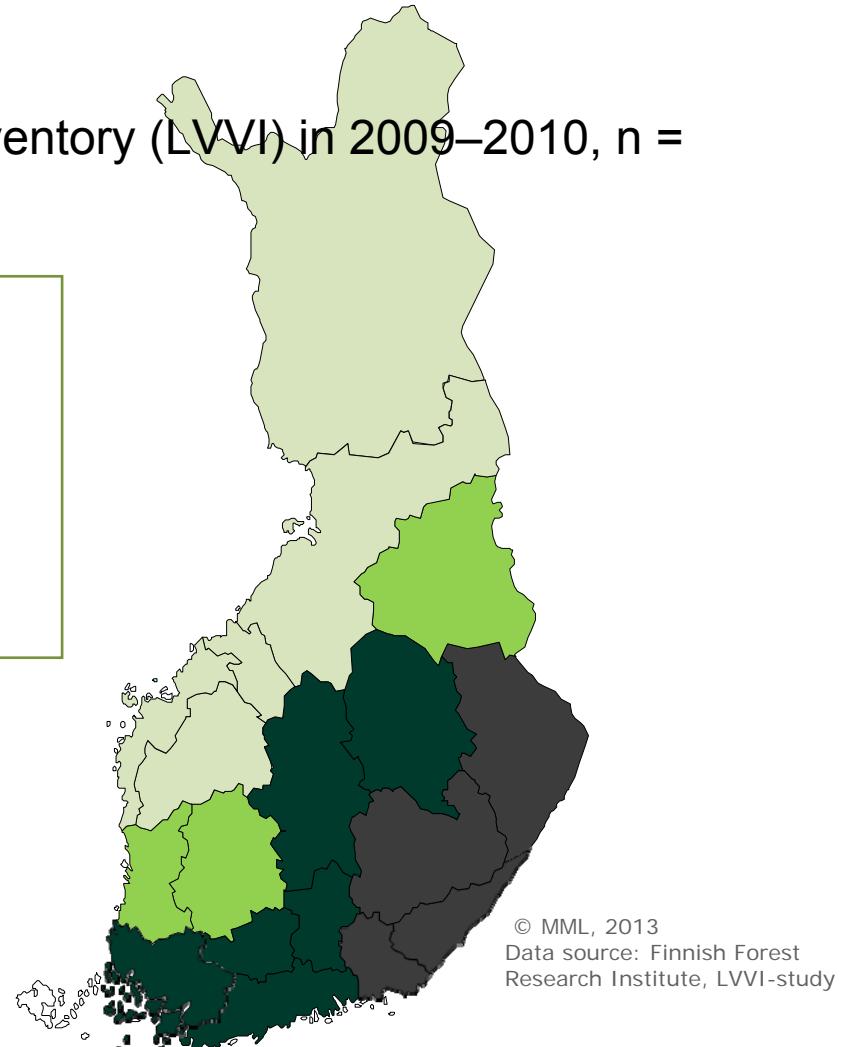
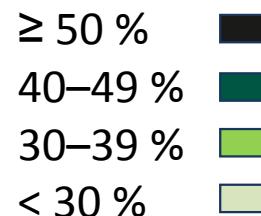
- Questionnaire surveys among households (Univ. of Eastern Finland):
Turtiainen et al. 2012. Picking of wild edible mushrooms in Finland in 1997–1999 and 2011. *Silva Fennica* vol. 46.
- Outdoor recreation statistics 2010 (Metla: National outdoor recreation demand inventories (LVVI) in 1998–2000 and 2009–2010.

<http://www.metla.fi/metinfo/monikaytto/lvvi/index-en.htm>

Participation in mushroom picking

National Outdoor Recreation Demand Inventory (LVVI) in 2009–2010, n = 8895.

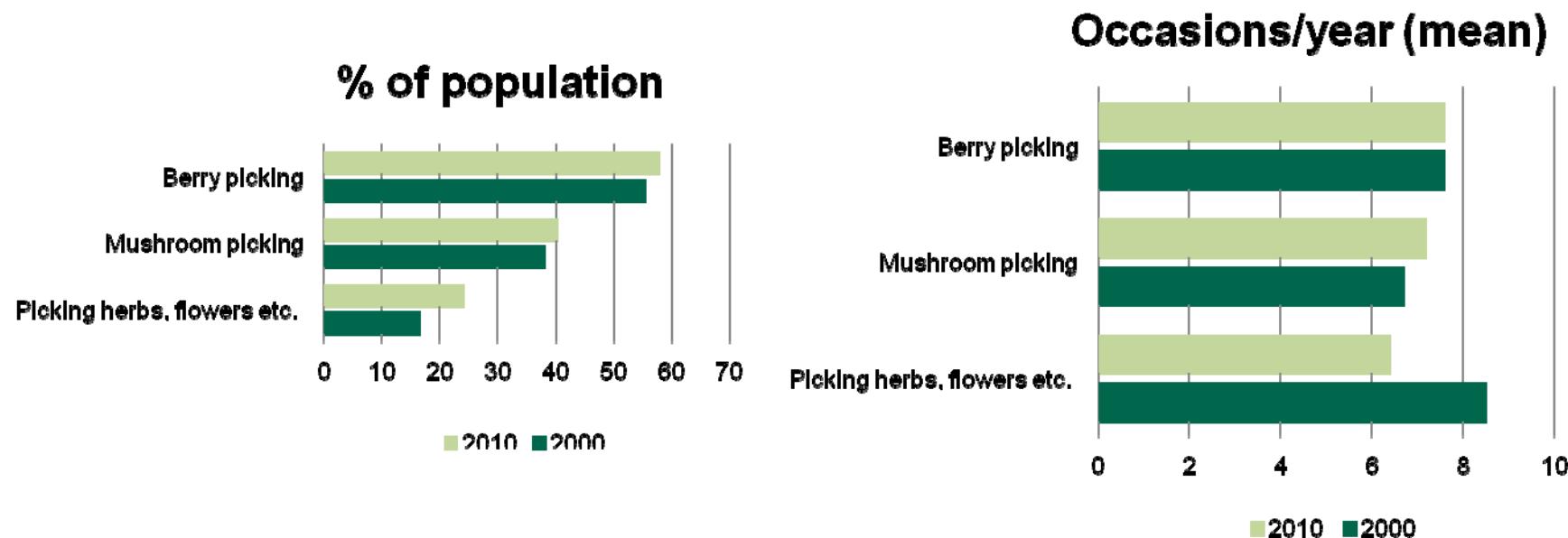
Total of 15–74 yrs. old population: **40 %**
Frequency of participation: **7 times/yr**



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Wild products picking in 2000 and 2010



Pouta, E., Sievänen, T. & Neuvonen, M. 2006. Recreational wild berry picking in Finland - Reflection of a rural lifestyle. Society and Natural Resources 19: 285–304.

Sievänen, T., Pouta, E. & Neuvonen, M. 2004. Participation in mushroom picking in Finland. In: Ito, T. & Tanaka, N. (eds.). Social Roles of Forests for Urban Population - Forest Recreation, Landscape, Nature Conservation, Economic Evaluation and Urban Forestry. Japan Society of Forest Planning Press, p. 122–137.

Data & models

- Nationwide: MASI – permanent sample plots on berry and mushroom yields since 1997 (Kauko Salo/Metla)
 - www.metla.fi/metinfo/monikaytto/marjasieni
- Local data sets: e.g. 52 sample plots in eastern Finland (Mikko Kurttila/Metla)
 - estimates on commercial mushroom yields in spruce stands
 - Preliminary yield model for *Boletus edulis*
- Aim to develop empirical and expert yield models for boletus
 - And/or a common yield model for all commercial mushrooms



KNOWLEDGE

Know-how

Well-being

Thank you

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Forest mushrooms & truffles in Slovakia

- Miroslav Kovalčík
- National Forest Centre Zvolen



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Forest mushrooms & truffles in Slovakia

- Forest mushrooms - important commercial, environmental, social and recreational roles
- Potential for picking in all forests
- **The most important species:**
- boletus – *Boletus edulis* and *Boletus sp.*
- chestnut boletus – *Leccinus sp.*
- russula – *Russula sp.*
- *Xerocomus sp.*
- chanterelle – *Cantharellus cibarius*
- honey agaric – *Macrolepiota sp.*



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Forest mushrooms & truffles in Slovakia

- Availability of data:
- 4 national surveys: 2006, 2007, 2008 and 2011
- random sample of 5 168 Slovak inhabitants
 - 1 534 interviews in 2006,
 - 1 732 interviews in 2007,
 - 1 402 interviews in 2008 and
 - 500 interviews in 2011
- representative sample of the Slovakian population in terms of location, age and gender
- Face to face interview
- non-pickers included in the sample
- surveys conducted after the course of the season
- questions focused on picking for own consumption and for sale, and information on the commercial prices as well



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Forest mushrooms & truffles in Slovakia

Other available data:

- research on potential production of mushrooms by different forest types
- research on selling prices of forest mushrooms in the markets

Results:

- on average, 27 488 metric tons of forest mushrooms collected every season, with a maximum of 34 126 tons in 2006
- mean value of 55 mil €, with a maximum of 95 mil € in 2007
- pickers sale for 2 – 3 €/kg
- traders 5 – 6 €/kg



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Forest mushrooms & truffles in Slovakia

Results:

- under estimated results – picking for sale
- pickers are unwilling to share information about their activities
- awareness that they access the resource without a required authorization
- worries about possible changes in wild mushrooms regulations
- free access to forests in Slovakia and possibility of picking for own consumption



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Eruwaptóto'wú

Grazie per la vostra attenzione
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Muchas Gracias!
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Ďakujem za Vašu pozornosť
Dakujem za Vašu pozornosť

Thanks for your attention
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WG1: Mushrooms & truffles



Pawel Staniszewski

Department of Forest Utilisation

Warsaw University od Life Sciences –

SGGW



Forest mushrooms collecting in Poland:

Significant (but not large!) number of poisoned mushrooms



people are still more and more afraid...

Forest mushrooms collecting in Poland:

54 species (excl. lichens) - under strict protection



Most of them – unknown!



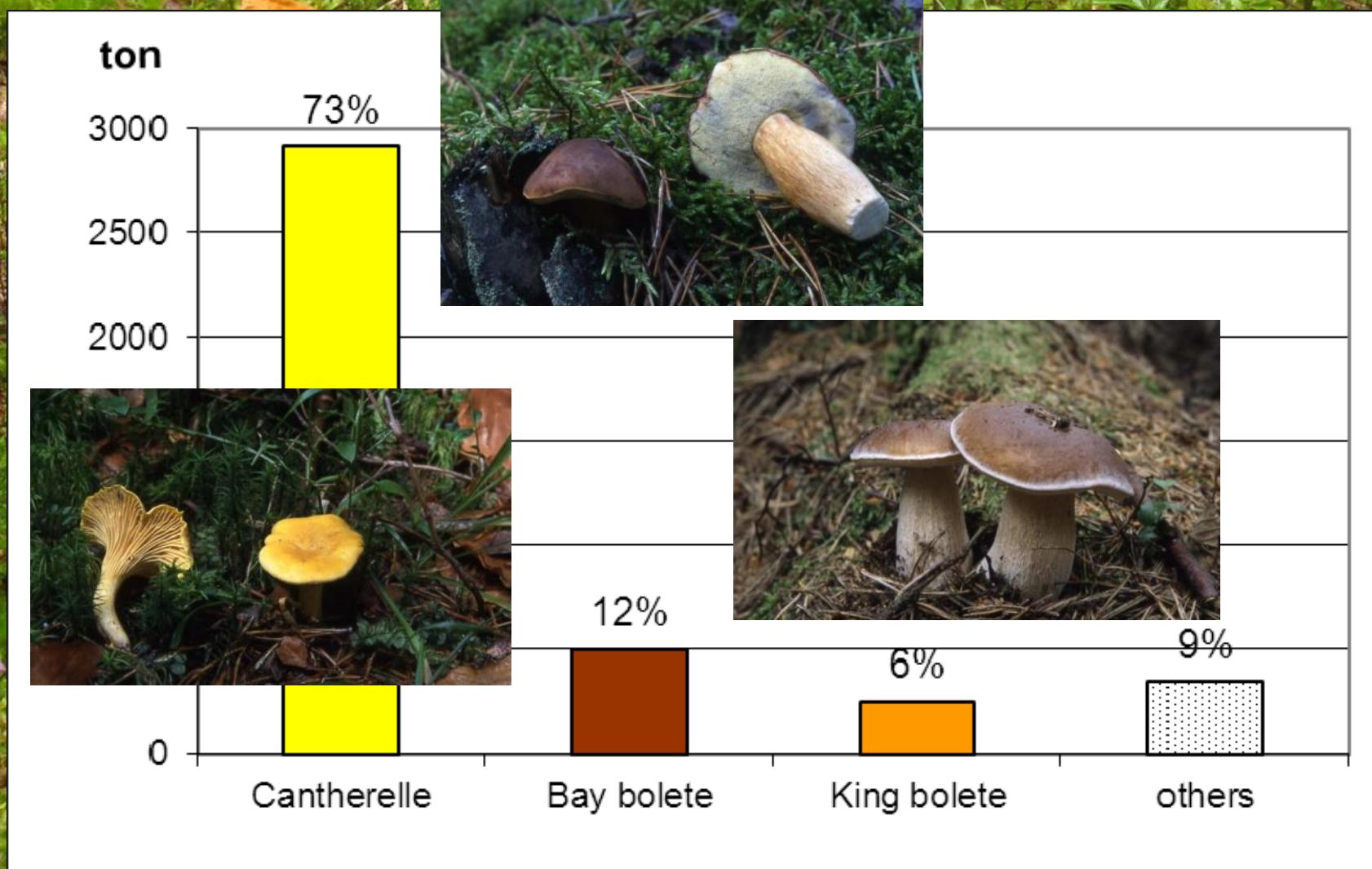
Forest mushrooms collecting in Poland:

More then 1000 species of edible mushrooms

42 species permitted for the commercial use
(Ministry of Health Decree, 2011)

Less then 10 species usually harvested!

Most important species of forest mushrooms harvested in Poland (in 2011)



Source: Leśnictwo 2012 [Forestry 2012] Główny Urząd Statystyczny [Main Statistical Office]

Available data in PL

	Official data (purchase only!)	Estimation
Quantity	4 000 T / year	~ 100 000 T / year
Value	13 000 000 EUR / year	180 000 000 – 540 000 000 EUR / year

Lack of efficient information!

Case studies in PL

Fresh mushroom prices in the local market (Mazury region):

- Bay bolete: 2 – 4 EUR/kg
- Chantherelle: 3 – 7 EUR/kg
- King bolete: 7 – 26 (!) EUR/kg
(avg: 6 – 7 EUR/kg)

Those prices are at least twice higher than at purchase centres!

People collecting mushrooms earn 110 - 730 EUR / person / month

(avg. salary in PL: ~ 1 000 EUR / month)

[Morawiak 2011; Nawrocki 2012; Pawlukojć-Bojarska 2004]



Fot.: P. Staniszewski

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Working Group 1 session
Thursday, February 20th '14
14:00-16:00



Krakow

Forest Mushroom Value Chain

Case study of Serbia



Ljiljana Keča, Ass. Professor
Nenad Keča, Ass. Professor
Milica Marčeta, PhD. student

Faculty of Forestry
University of Belgrade



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1. Commercially important mushroom species

1. *Boletus edulis* Bull. Fr.



2. *Cantharellus cibarius* L. Fr.



3. *Lactarius deliciosus* (L.) S.F.Gray.



4. *Marasmius oreades* (Bolt. Fr.) Fr.



5. *Tuber magnatum*/ *Tuber aestivum*



6. *Craterellus cornucopioides* Pers.



2. Facts – TARGETING value chain

Employment to up **100,000** persons



- ✓ Reduce poverty
- ✓ Additional income

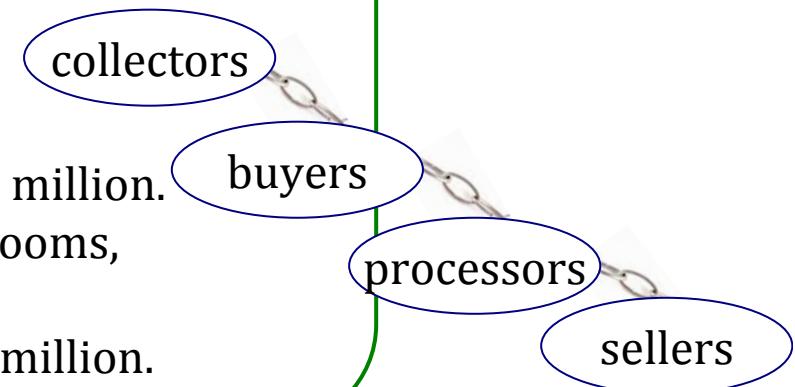


The government establishes a **quota** for the value chain, limiting the total quantity of collecting/exports.



Market / Export - 2013.

- principal market for the export of forest mushrooms is the EU,
- USD 10 million worth of fresh (chilled) forest mushrooms to the EU,
- Chanterelles accounted for USD 5.9 million, while fresh porcini and others accounted for USD 4.2 million. In second place was the export of dried forest mushrooms, at about USD 8.5 million, followed by preserved forest mushrooms at USD 3.6 million.



Value chain analysis



- Growth potential
- Targets for improvement

3. Methodology

Sample

Population

Compilation of data from MESP and SBRA

Stratified random sample

Strata

4 *4 strata (PRODUCTS AND STATISTICAL REGIONS in SERBIA)

Quantitative method.

Survey

Income/outcome
Processing capacities
Products
Supply
Export destinations
Prices
Distribution channels
Promotion
Business environment

Data analysis

Data preparation

Questionnaire checking

Coding

Tables of primary data

Statistical analysis

Descriptive statistics
Correlation analysis
(M)ANOVA

Marketing mix

4 Ps

1. product,
2. price,
3. promotion,
4. place

SWOT and A'WOT

1. conduct classical SWOT analysis
2. each factor is assigned a certain number of points
3. results will be analyzed and graphically presented

Value chain analysis

- identification of the chain participants and their relationships
- horizontal and vertical integration within the chain
- institutional environment and legal framework



4. ... Some of the results

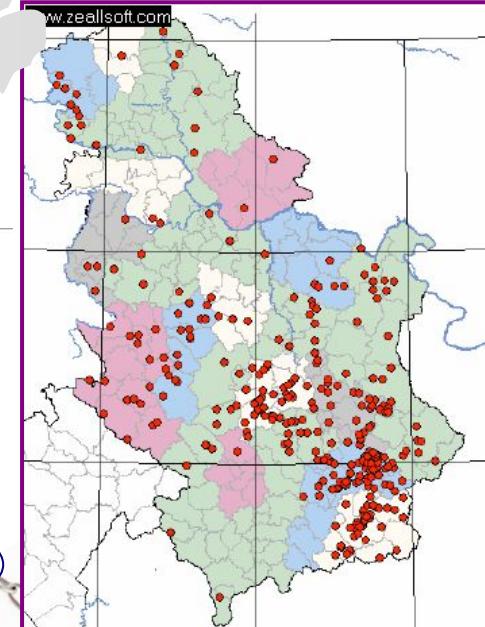
- SMEs in **mushroom** business - **49**, leading **10**.
- **93%** usage of capacities.
- **Italian** traders dominate the market.
- Increasing role of standards.
- Since the **quota system** limits real quantitative growth, growth for the value chain therefore must come from higher value exports, implying a **gradual shift in volume from bulk to retail**.
- **Exponential model** of processed mushrooms.
- Price is variable depending on the balance of supply and demand through the year, for example mushrooms may only command **2-3 Euros** per kg in early autumn, but fetch as much as **5-10** at the end of the season.

Product	$\ln \cdot a$	$t_{(ln \cdot a)}$	b	$t_{(b)}$	R	F	Average-annual-growth-rate %
Fresh <i>Boletus edulis</i>	-1.203.30	-4.48	0.600	4.49	0.933	20.14	60.04
Fresh <i>Cantharellus cibarius</i>	-1.412.81	-4.75	0.705	4.75	0.940	22.59	70.49
Marinated <i>Agaricus sp.</i>	-352.82	-5.24	0.178	5.29	0.950	28.01	17.76

Collectors



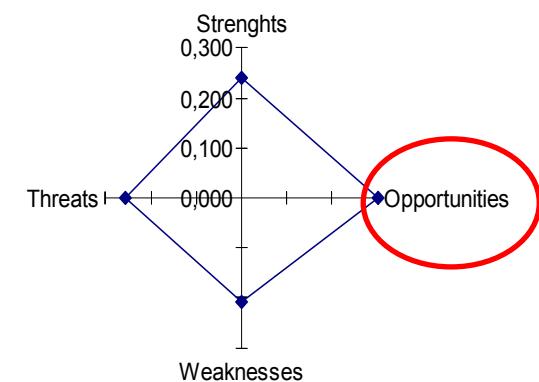
collectors



buyers

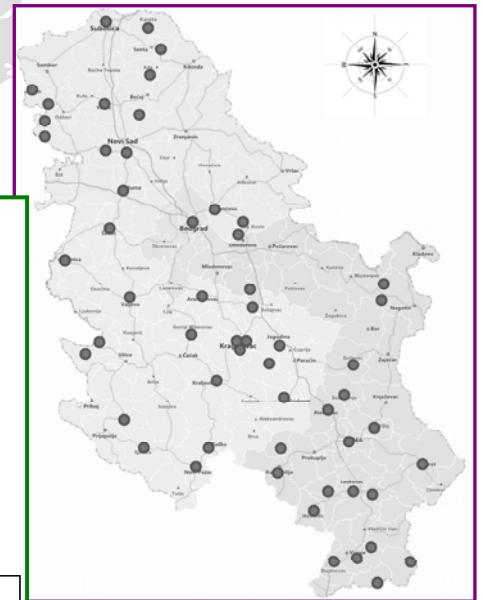
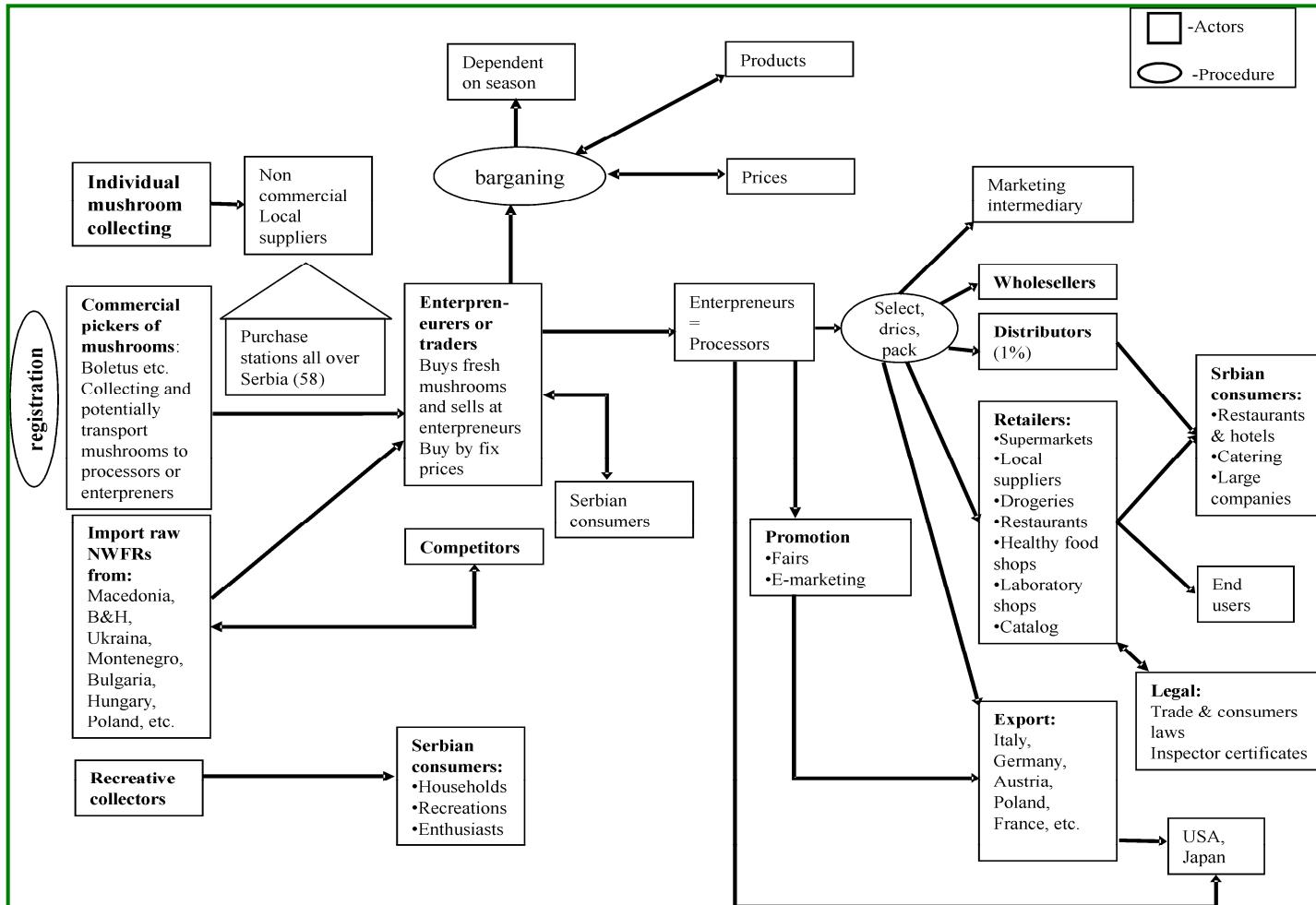
processors

sellers



5. Value chain of mushrooms

Processors



Ministry of Environment, Mining and Spatial Planning

Ministry of Agriculture, Trade, Forestry and Water Management (Forest Directorate)

Institute for Nature Conservation of Serbia

Province Institute for Nature Conservation of Vojvodina

The weightings attributed to different factors in the SWOT/AHP analysis show that the most important ranked were increase in **demand and location of purchase** stations (both 0.083) followed by **climatic condition** – amounts of NWFPs directly influenced by **climate** (0.075), whereas **insufficient export orientation** and (0.052) and **lack of staff** (0.046) seemed to be relatively unimportant.

6. ... Few references in NWFPs



- Keča Lj., Keča N., Rekola M. (2013): Value chains of Serbian non-wood forest products, International Forestry Review 15(3), 315-335.
- Keča Lj. 2013. An analysis of marketing mix elements in the business of small and medium enterprises dealing with NWFPs in the statistical region of Belgrade. Bulletin of the Faculty of Forestry 108: 51-66.
- Keča Lj., Bogojević M. 2013. Commercialization and marketing of non-wood forest products in Central Serbia. Bulletin of the Faculty of Forestry 107: 101-126.
- Ranković N., Keča Lj., 2011: *Trade and Marketing of Forest Products*, University Book, Planeta Print, Belgrade (564)
- Keča, Lj., Bogojević, M., Marčeta, M., Jelić, S. (2012): Commercialization of Non-Wood Forest products on the territory of Vojvodina. *Bulletin of the Faculty of Forestry*. 105: 99-116.
- Keča Lj., Plavšić J. (2012): Institutional and Procedural Framework of Non-Wood Forest Product Processing and Placement in Serbia , Journal of Forestry processing wood, the horticulture and landscape architecture and environmental engineering and protection of land and water resources , LXIV, 3-4, (33-50).
- Keča Lj. Keča N. (2012): Legal aspects of non-wood forest products in Serbia, Proceedings of 13th International Symposium on “Legal Aspects of European Forest Sustainable Development” (IUFRO), IUFRO Research Group 9.06.00, Lithuanian University of Agriculture Faculty of Forestry and Ecology and the Lithuanian Ministry of Environment Department of Forestry (158-166)
- Keča, Lj., Keča, N. (2011): Legal framework of non-wood forest products in Serbia, Proceedings of 13th International Symposium on Legal aspects of European Forest Sustainable Development. IUFRO Division 6.13.00 – Forest Law and Environmental Legislation, May 17-21 2011, Kaunas, Lithuania.
- Keča Lj., Nedeljković J. 2010. Analisys of marketing mix elements of non-wood forest products in Central Serbia. Bulletin of the Faculty of Forestry 102: 83-100.

6. ... Few more references in NWFPs

Marčeta, M., Keča, Lj. (2013): Analysis of Sale of Non-Wood Forest Products from Northern Serbia on the Domestic and Foreign Markets. *Baltic Forestry*, 19(2).

Keča, Lj., Marčeta, M., Bogojević, M. (2012): Non-Wood Forest products as generator of development of rural areas of Serbia. *Agriculture & Forestry*. Vol. 57. (11) Issue 3:21-37, 2012 , Podgorica, Montenegro

Keča, Lj., Bogojević, M., Marčeta, M., (2011): Trend of the total purchasing volume of Non-Timber Forest products in the area of the municipality of Ivanjica. *Forestry*, Journal of Forestry processing wood, the horticulture and landscape architecture and environmental engineering and protection of land and water resources 3-4 (87-97)

Keča, Lj., Bogojević, M., Marčeta, M. (2012): Organization marketing activities in enterprises for buying processing and selling of medical and aromatic plants in Serbia. Proceedings of the 7th Conference on Medicinal and Aromatic Plants of Southeast European Countries, Subotica (Serbia), 2012, May 27 -31 (205-213)

Keča, Lj., Marčeta, M., Bogojević, M. (2012): Organization marketing activities in leader enterprises for purchase, processing and placement of Non-Wood Forest products in Vojvodina. Proceedings of the 6th Central European Congress on Food, CEFood 2012, May 23-26, Novi Sad, Serbia (1707-1712)

Keča, Lj., Marčeta, M., Keča, N. (2012): Organization of marketing activities in enterprises for collecting, processing and marketing of Non-Timber Forest products. Paper from 8th regional conferences “Green economy and institutional arrangements for sustainable development” to meet the World Summit Rio+20, 22-23 May 2012, Belgrade, Serbia

Keča, Lj., Marčeta, M., Mladenović, D. (2013): Analysis of purchase and placement of non-wood forest product in Southern Serbia. Proceedings of the 4th International Scientific Symposium „Agrosym 2013“, Jahorina, BiH (173-180)

Keča, Lj., Marčeta, M. (2013): The effects of economics and natural environment in business of enterprises in sector of non wood forest products in Serbia. Book of abstract of 2nd ICP Forests Scientific Conference – 2013 „ICP Forests today's evaluations and future monitoring, (28/29 May 2013, Belgrade, Serbia), (30 p.)





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Department of Forestry

Chair of Forest Economics, Policy and Organisation

Forest Economics, Trade and Marketing, Forest Policy

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MUSHROOMS AND TRUFFLES IN ROMANIA

LUCIAN DINCA, IOVU BIRIS, ION VOICULESCU, MARIA DINCA
FOREST RESEARCH AND MANAGEMENT INSTITUTE
ROMANIA



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DATABASE

Before 1990: centralized documents regarding the harvesting of accessory products towards the resort ministry.

After 1990: RNP-Romsilva situations and those of Environment and Rural Development Ministry, Biodiversity Directorate (by researching the quantities of accessory forest products that were approved at the issuance of the environment notice necessary for their harvesting and processing).



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The situation of edible mushroom harvests from the period 1968-1989

Species	Total tons	% from total	Annual average (tons)	Variation amplitude	Standard deviation	Variation coefficient %	The average's confidence interval for $\alpha=5\%$ (distrib. Student)
Total mushroom (1968-1989)	68714	100	3123	12456	2745,2	88	3123±1835
<i>Boletus sp.</i> (1968-1989)	45414	66	2064	13296	2861,5	139	2064±1912
<i>Armillaria mellea</i> (1968-1989)	14278	21	649	1546	446,9	69	649±299
<i>Cantharellus cibarius</i> (1968-1989)	5787	8	263	996	311,2	118	263±208
Other species (1968-1989)	3235	5	147	386	115,9	79	147±77

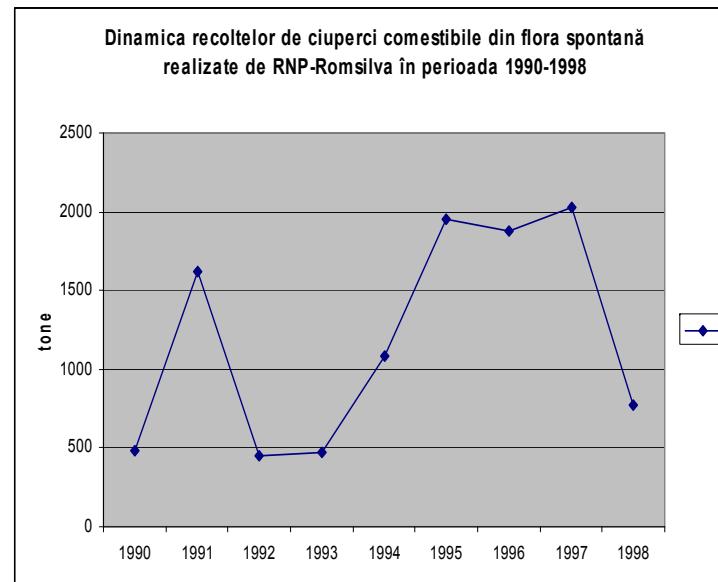


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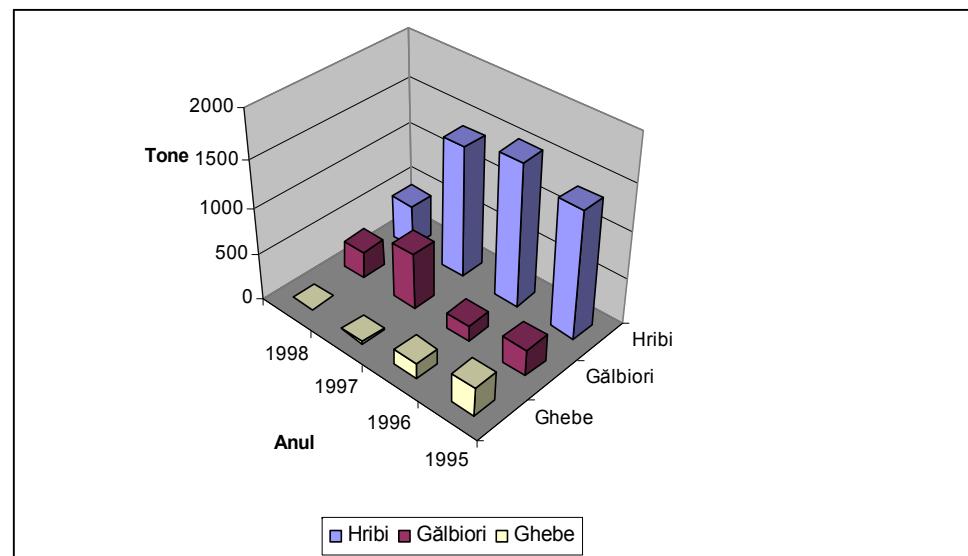


The situation of edible mushroom harvests in the interval 1990-1998 realized by RNP-Romsilva

Total tons	Annual average	Variation amplitude	Standard deviation	Variation coefficient %	The average's confidence interval for $\alpha=5\%$ (distrib. Student)
10729	1192	1582	679,9	57	1192 ± 556



Species	Total (tones)	% from total	Annual mean (tones)
All species (1995-1998)	6628	100	1326
<i>Boletus sp.</i>	4774	72	955
<i>Cantharellus cibarius</i>	1347	20	269
<i>Armillaria mellea</i>	507	8	101



TRUFFLES

Annual export (personal estimation):
15 tonnes, from which:

- 90% black truffles (*Tuber aestivum/uncinatum*)
- 10% white truffles (*Tuber magnatum*)



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Mushrooms and truffles in Slovenia

What you see is not what you can buy

Tine Grebenc

Slovenian Forestry Institute, Vecna pot 2, Slovenia
tine.grebenc@gozdis.si



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Mushrooms and truffles in Slovenia

Official statistics

- Official data available since 1994 – for 20 commonly marketed species
Collecting and trading arranged by the Regulative on collection of wild mushrooms (Official Gaz. 57/98, 58/11)

For private use 2 kg per person per day is freely allowed and **NOT NI STATISTICS!**

List of (official) trading species

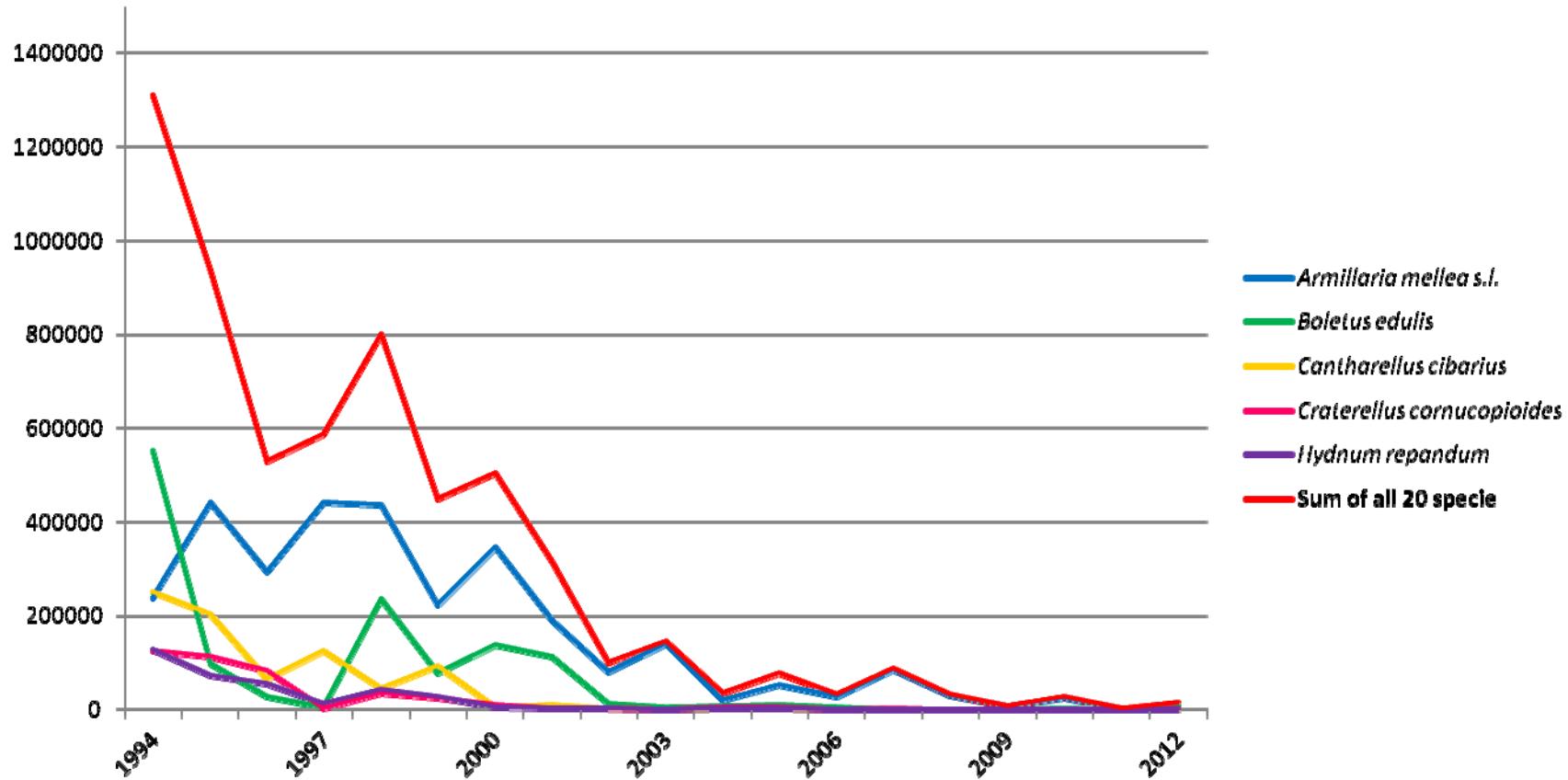
<i>Agaricus campestre</i>
<i>Albatrellus pes-capre</i>
<i>Armillaria mellea s.l.</i>
<i>Boletus edulis</i>
<i>Boletus pinophilus</i>
<i>Cantharellus cibarius</i>
<i>Cantharellus tubaeformis</i>
<i>Clitocybe geotropa</i>
<i>Craterellus cornucopioides</i>
<i>Hydnus repandum</i>
<i>Hygrophorus marzeolus</i>
<i>Lactarius deliciosus s.l.</i>
<i>Leccinum spp.</i>
<i>Lyophyllum fumosum</i>
<i>Macrolepiota procera</i>
<i>Morchella esculenta</i>
<i>Russula spp.</i>
<i>Suillus bovinus</i>
<i>Tricholoma portentosum</i>



Mushrooms and truffles in Slovenia

Official statistics

Recorded amounts of traded mushrooms (in kg per species)



Mushrooms and truffles in Slovenia

RED list

- Only species from RED list are not allowed to be collected and traded
- A large network of mushroom picking societies with many unofficial data (for localities and ecology!)

See RED list at:

http://www.uradni-list.si/files/RS_2010-042-02122-OB~P001-0000.PDF#!/pdf

Special case – truffles!



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Mushrooms and truffles in Slovenia Truffles

Available on (black) market:

- *Tuber magnatum*
- *Tuber borchii*
- *Tuber melanosporum*
- *Tuber brumale*
- *Tuber aestivum*

No official trading data

**Ecology data extractable from herbarium
at SFI**



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MUSHROOMS & TRUFFLES IN SPAIN



- José-Antonio Bonet; Juan Martínez de Aragón; Fernando Martínez-Peña & Daniel Oliach

LA VOZ DEL PIRINEO.

SEMANARIO DE NOTICIAS È INTE



Nos dicen de Ribas que este año se ha establecido allí una nueva industria, debida á la facilidad de transporte del genero, por el ferrocarril de Ripoll á Barcelona.

Esta industria consiste en la recolección de hongos, que nosotros amamos **ruballons**, á la que se dedican un gran numero de vecinos el valle de Ribas en vista del buenrecio á que los pagan.

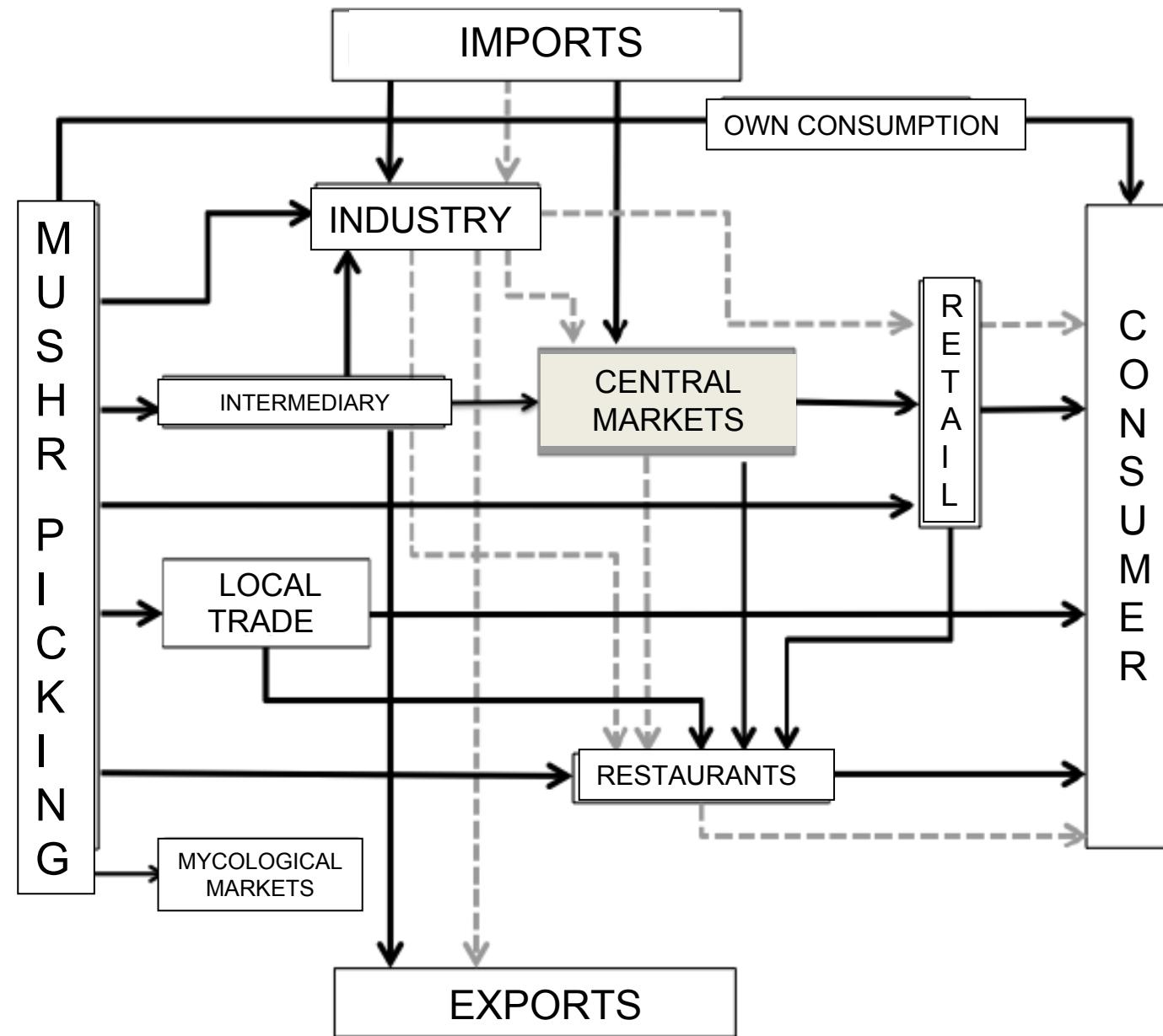
Para formarse una idea de los muchos que se expedien para Barcelona, vasta decir que, en la pasada semana, se pagó por su transporte en el ferro-carril de Ripoll, la considerable cantidad de 175 pesetas.



Main species and main figures

- ➡ 93 species are authorized for commercialization + 2 with specific treatment (*Morchella* sp., *Helvella* sp.)
 - 59 are wild species
 - 34 are cultivated species
- ➡ (Not so good) official statistics shows a mean of 10,000 t of wild mushrooms marketed every year (without truffles)
- ➡ *Lactarius deliciosus* is the most traded species. 3 main central markets in Spain (90% of the trade) reported productions of 274-808 t and prices between 6,08-16,22 €/kg (period 2002-2011)- (Diaz-Balteiro et al., 2013)

Theoretical framework of the wild mushroom chain value (Díaz-Balteiro et al. 2013)



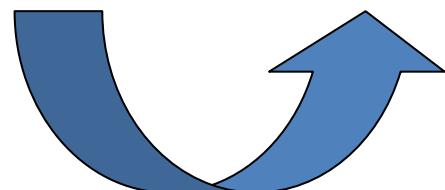
Black lines are for fresh mushr. trade. Dotted lines are for prepared mushr. trades

Economy can be enlarged... The case of Castilla y León



65 millions €/year

- * **1% property rights**
- * **20% mushroom picking**
- * **40% agro-food industry**
- * **39% mycotourism**



Truffles (and Desert Truffles)

- Authorized *Tuber* species include *T. melanosporum*, *T. aestivum* (*T. uncinatum*), *T. brumale*, *T. magnatum* and *T. indicum*
- Three species of *Terfezia* are authorized (*T. leptoderma*, *T. arenaria*, *T. claveryi*)
- Total production of truffles in Spain:

T. melanosporum.- 20 t (in comparison with 28 t France, 12 t Italy)(source: GETT) (40 t this year)

T. aestivum.- 20-25 t (Non official statistics)

T. brumale.- (shhhh! Don't explain... but it's mixed with *T. melanosporum*)



Black truffle culture represents almost 80% of the total Black Truffle prod.

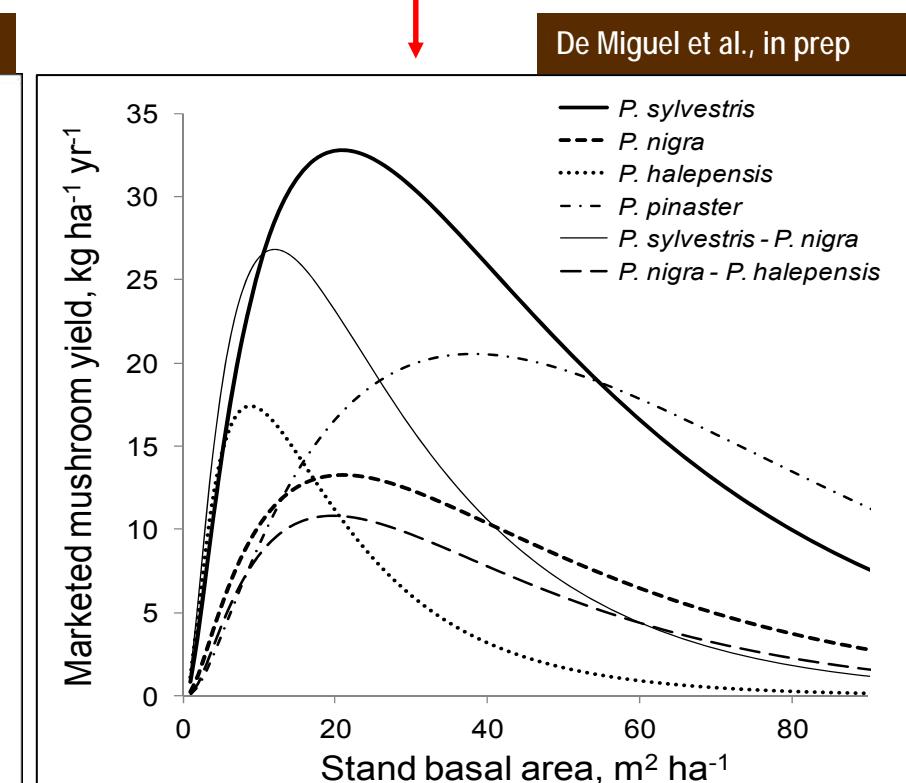
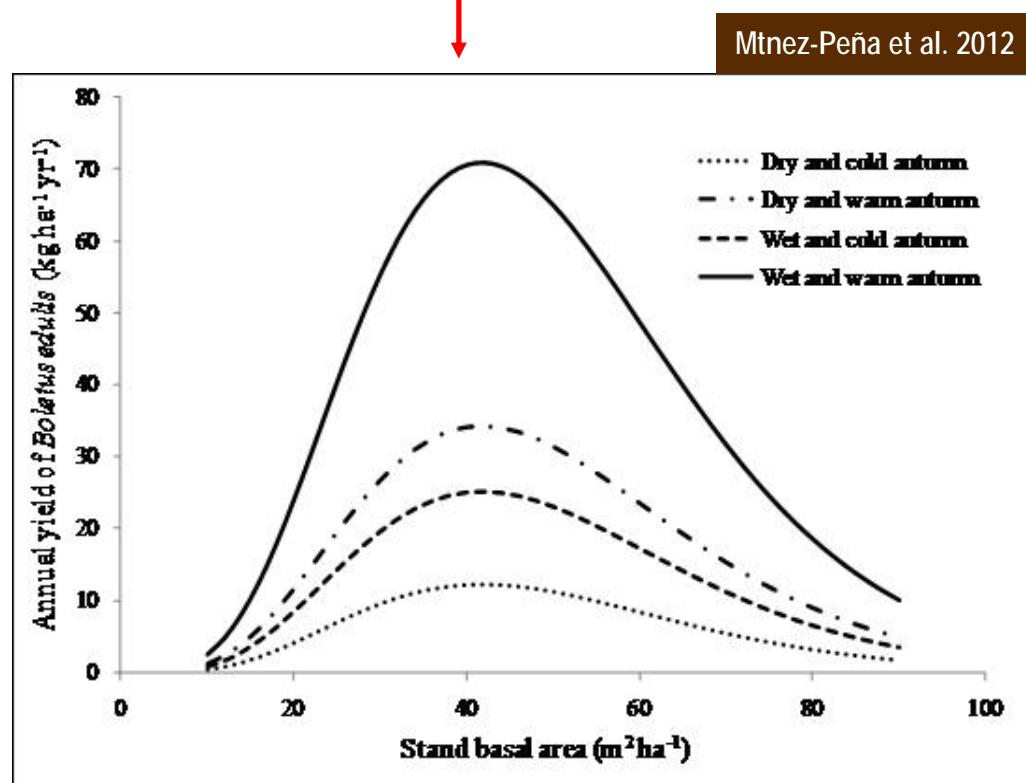


Available Data & Models (based on permanent plots)

Palencia-Valladolid (Northwestern Spain) (*P. sylvestris*, *P. pinaster*, *C. ladanifer* (3-11 yr. data))

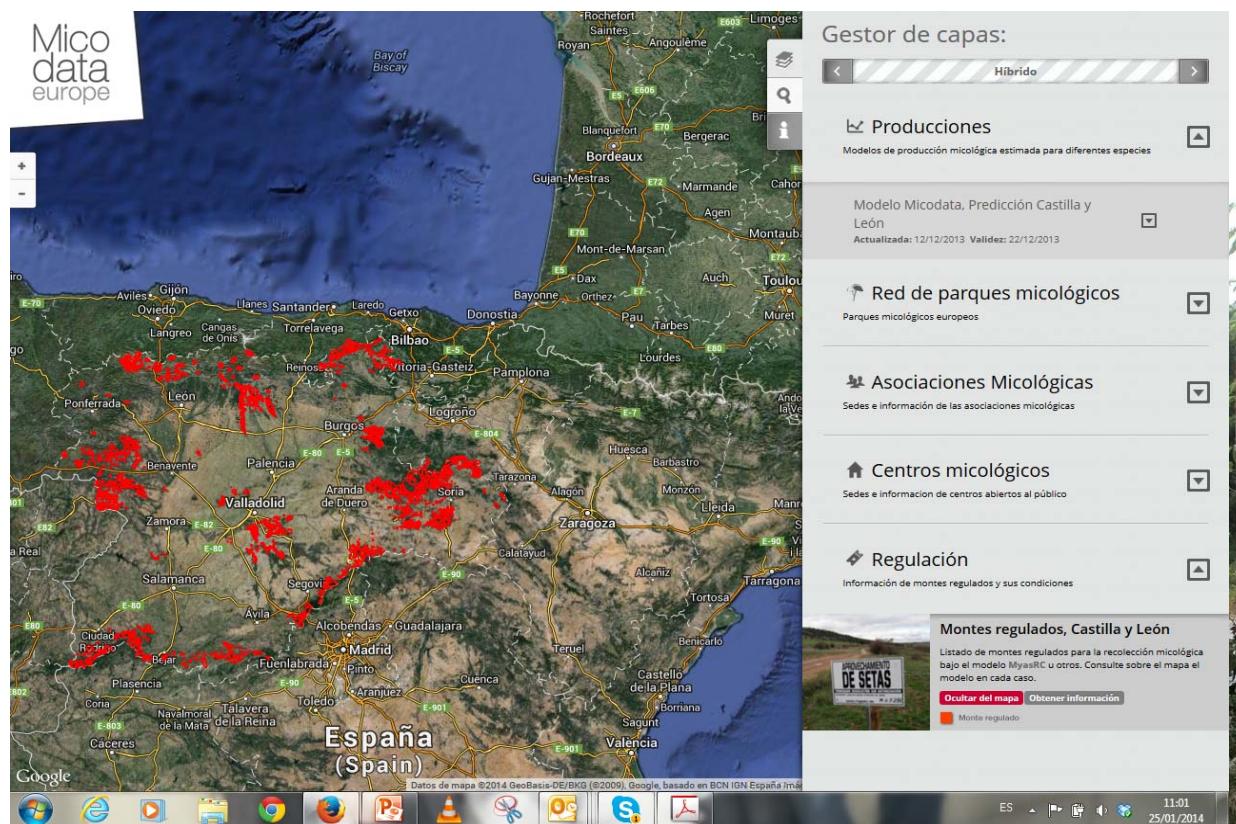
Soria (Central Spain) (*P. sylvestris*, *P. pinaster* (16-18 yr data))

Catalonia (*P. pinaster*, *P. nigra*, *P. sylvestris*, *P. halepensis*, *Q. ilex*) (6-12 yr. data)



Governance of the mycological resource

- ✓ License is needed for collecting truffles
- ✓ Free access to the forest for picking mushrooms except regions with specific regulations



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Workshop and MC Meeting, Krakow | 20 – 21 February 2014

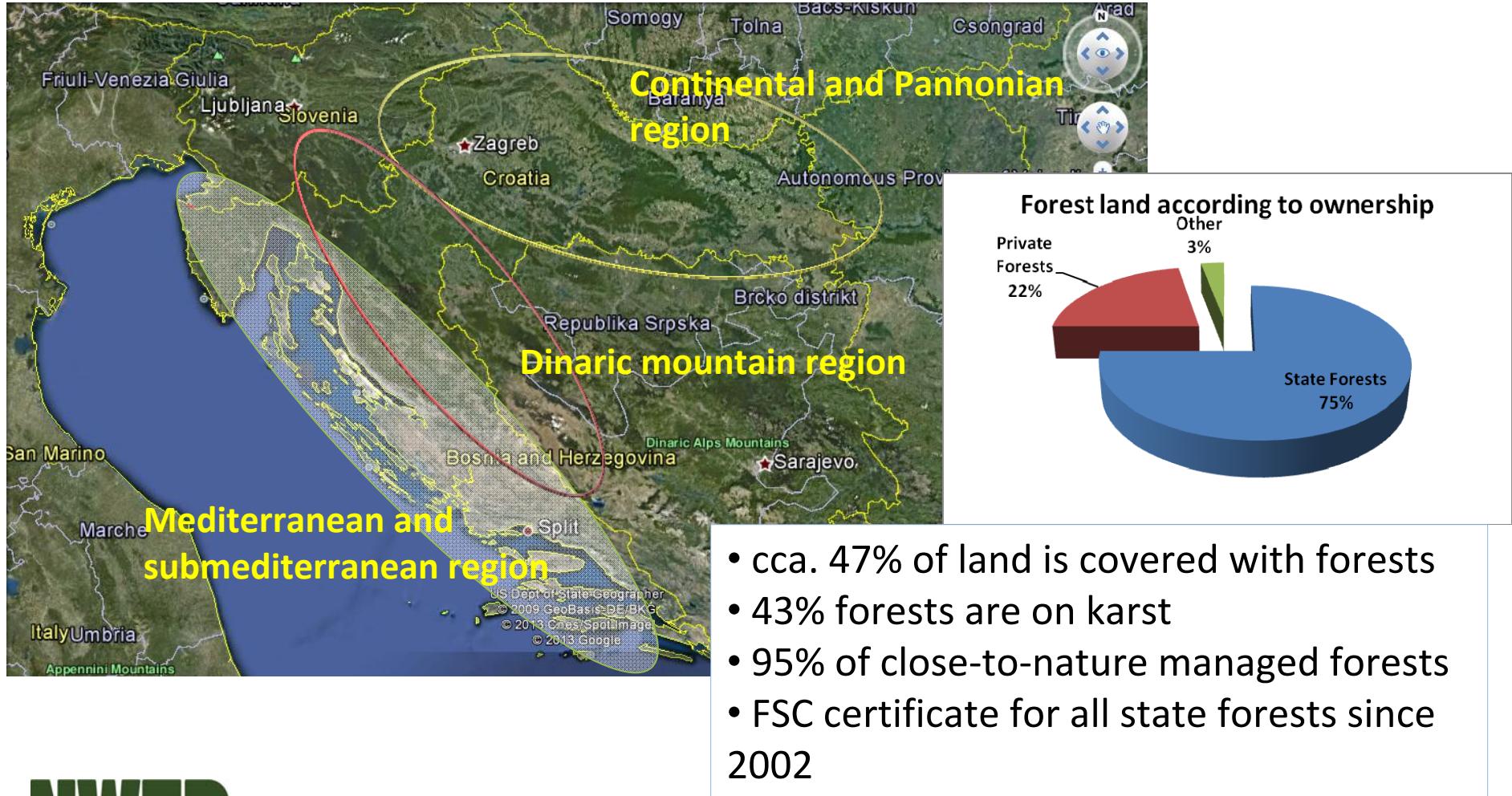
Mushrooms & Truffles as Non-Wood Forest Products in Croatia – state of the art



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Geographical position, regions and forest cover in Croatia



Legal framework & Data

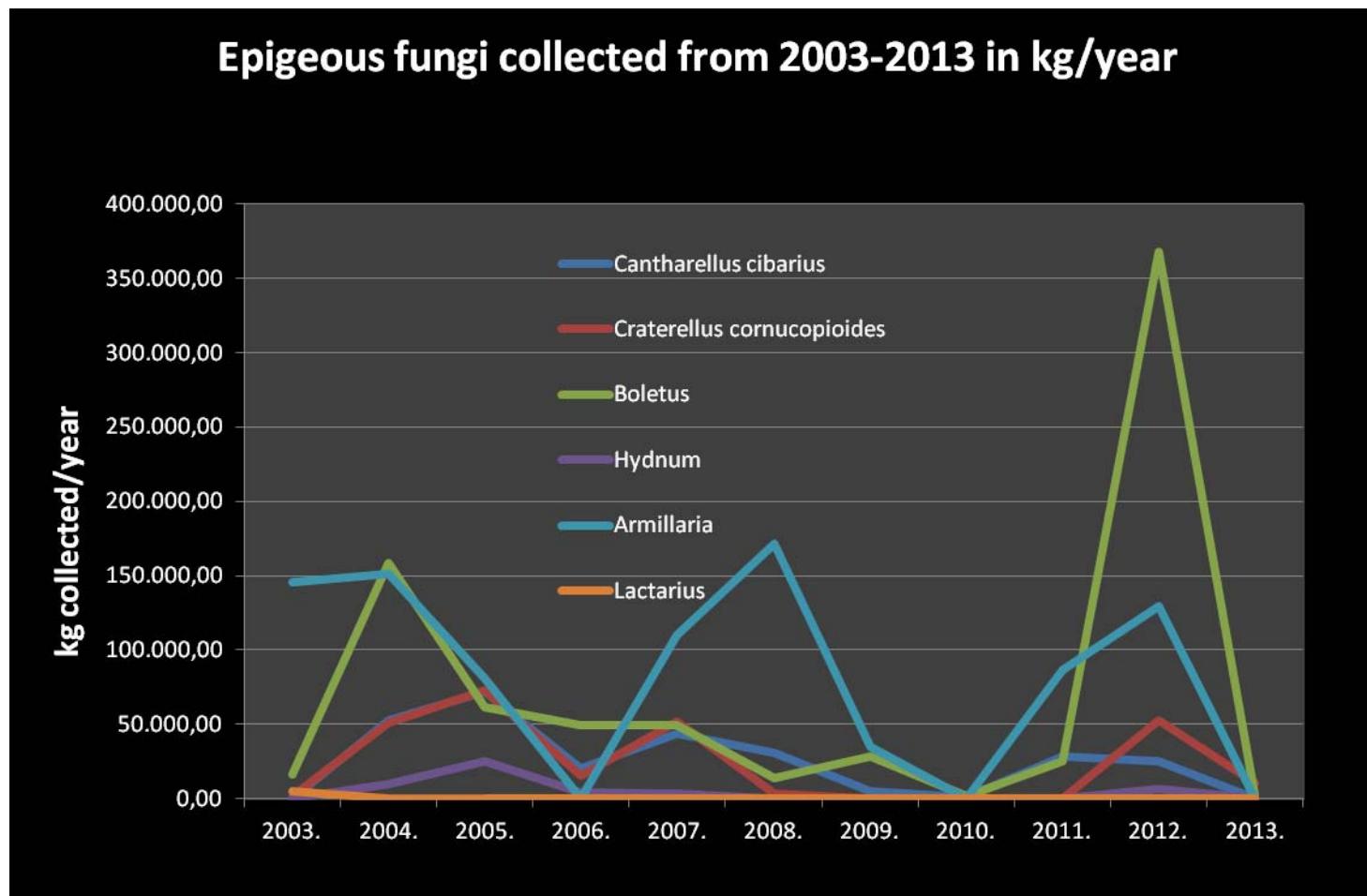
- Regulation on fungi protection ([NN 34/02](#))
 - regulates the status of M&T pickers, species, dimensions, quantities and season (for truffles only)
 - 6 epigeous, 1 hypogeous genera (32 commercial species in total)
- Croatian forests L.t.d. NWFPs pricelist (2007)
- Official data collected by Ministry of Environmental and Nature Protection
 - request for data submitted
 - questionable reliability of data



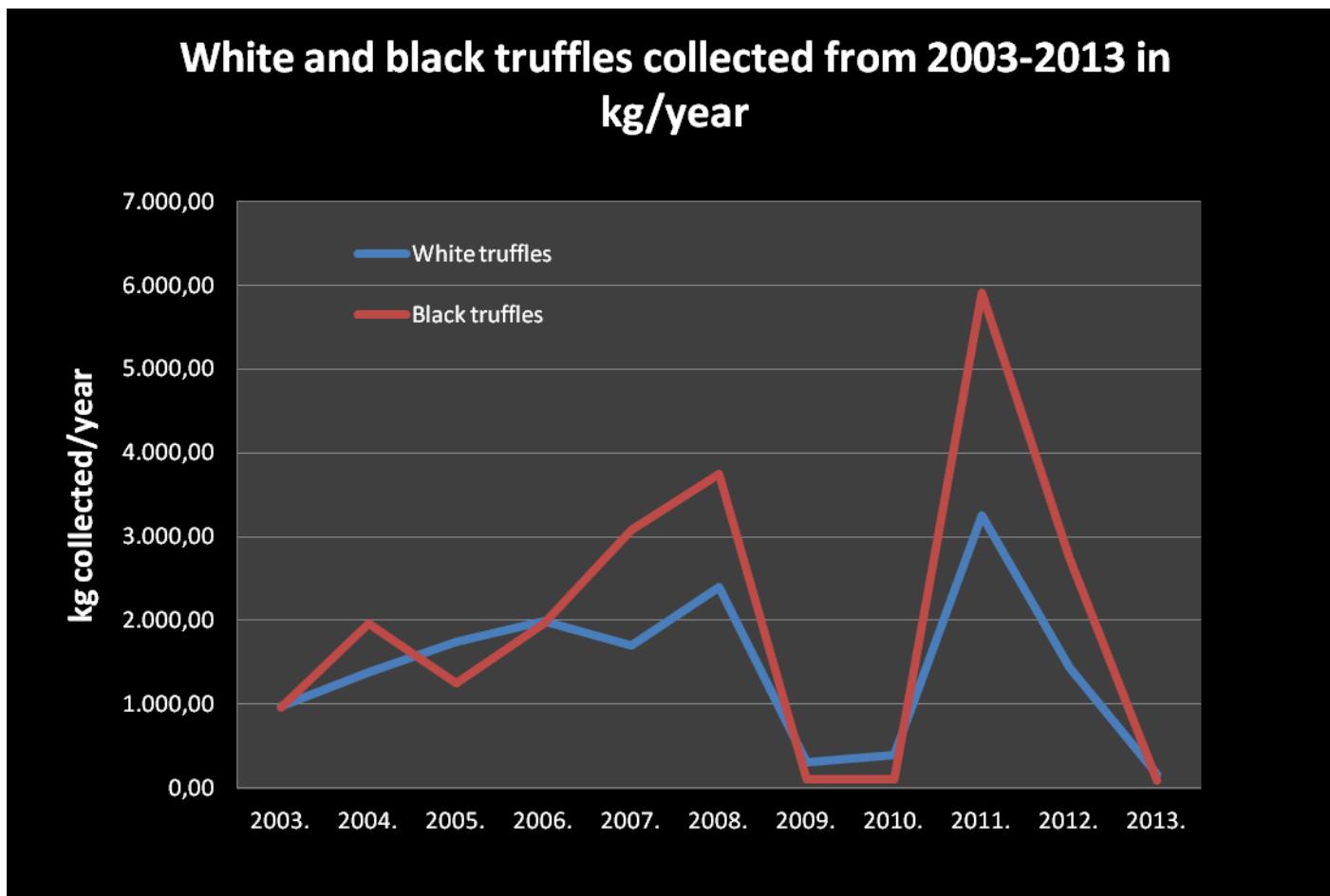
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Commercial fungi species collected in Croatia from 2003-2013 based on commercial pickers annual reports (kg/year)



Commercial fungi species collected in Croatia from 2003-2013 based on commercial pickers annual reports (kg/year)



Edible & Medicinal species in Croatia





Conclusions

- legal framework often confusing
- widespread black market
- scarce or no data on mushrooms & truffles
- small number of ongoing projects
- only few species marketed
- M&T present in Croatian touristic and gastronomic offer
- high socio-economic potential





**Thank you for your
attention!**

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