

European CWR threat assessment: knowledge gained and lessons learnt

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**Towards the establishment of genetic reserves for crop wild relatives and landraces
in Europe**

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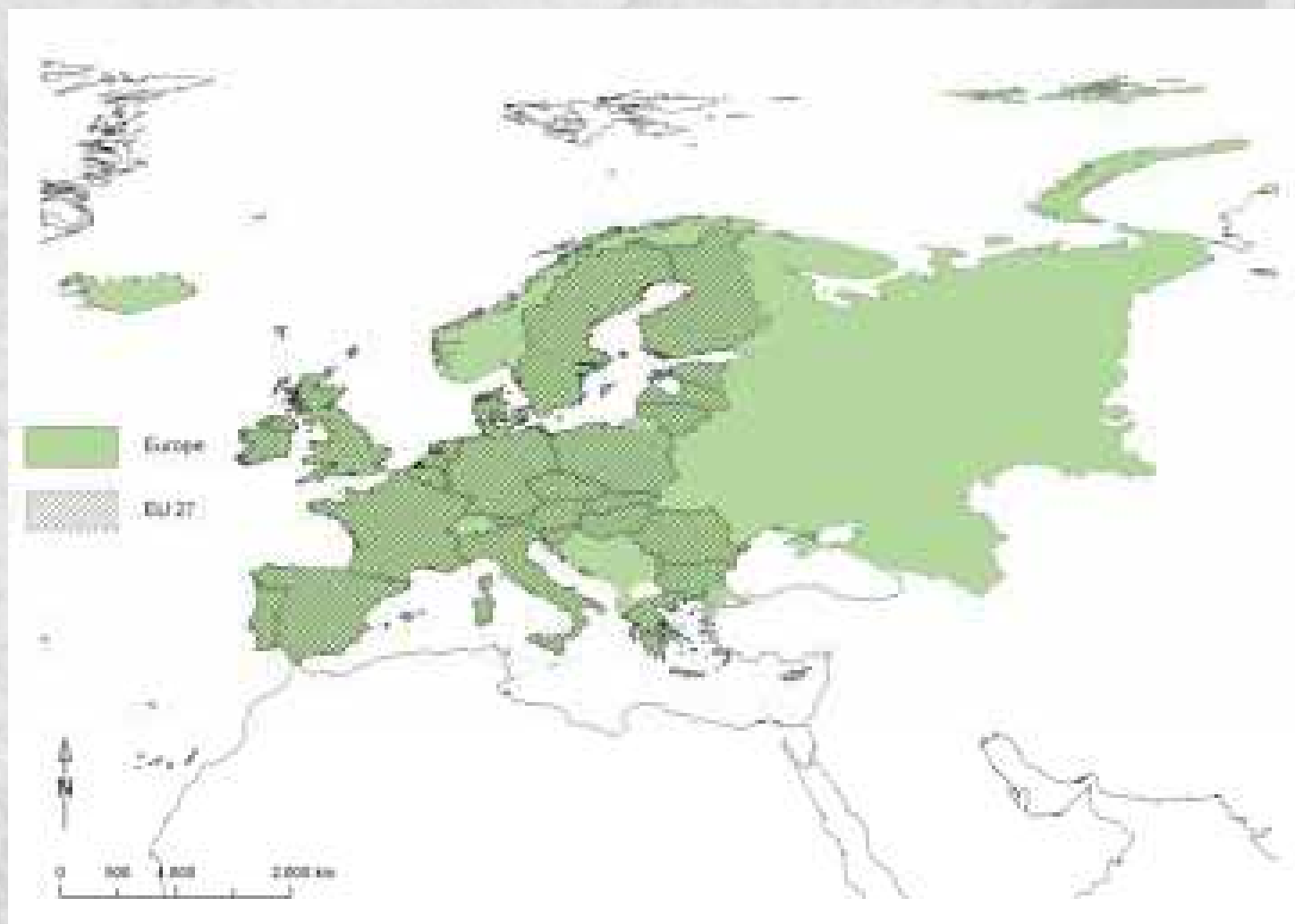
Objectives of this presentation

1. Introduce the European Red List project
2. Outline the process of selecting CWR species to assess
3. Summarize the Red Listing process
4. Present some preliminary results
5. Review knowledge gained and lessons learnt

European Red List: project introduction

- An IUCN initiative, funded by the European Commission
- Objective is to carry out threat assessment of around 6000 species to produce the first European Red List
- The list will include mammals, reptiles, amphibians, freshwater fishes, butterflies, dragonflies and damselflies, molluscs, beetles and selected vascular plants
- Three plant groups were selected for inclusion—CWR, aquatic plants and policy species (i.e., species listed in the Annexes of the Habitats Directive, Bern Convention, CITES and the EU Wildlife Trade Regulation)

European Red List: project area



European Red List: CWR selection

- Task: assess 500–600 European CWR species
- Not single country endemics
- A large number of CWR present in Europe
- Which ones should we assess?
- A clear process of target taxon selection was needed
- Maximize impact in raising awareness about the importance of European CWR and their conservation status

European Red List: CWR selection cont'd

Data sources:

- The CWR Catalogue for Europe and the Mediterranean (Kell *et al.*, 2005)
- GRIN Taxonomy for Plants (USDA, ARS, National Genetic Resources Program, 2009)
- Mansfeld's World Database of Agricultural and Horticultural Crops (Hanelt and IPK Gatersleben, 2001; IPK Gatersleben, 2003)

European Red List: CWR selection cont'd

1. **Step 1:** select species native to Europe (any species introduced before 1500 AD)

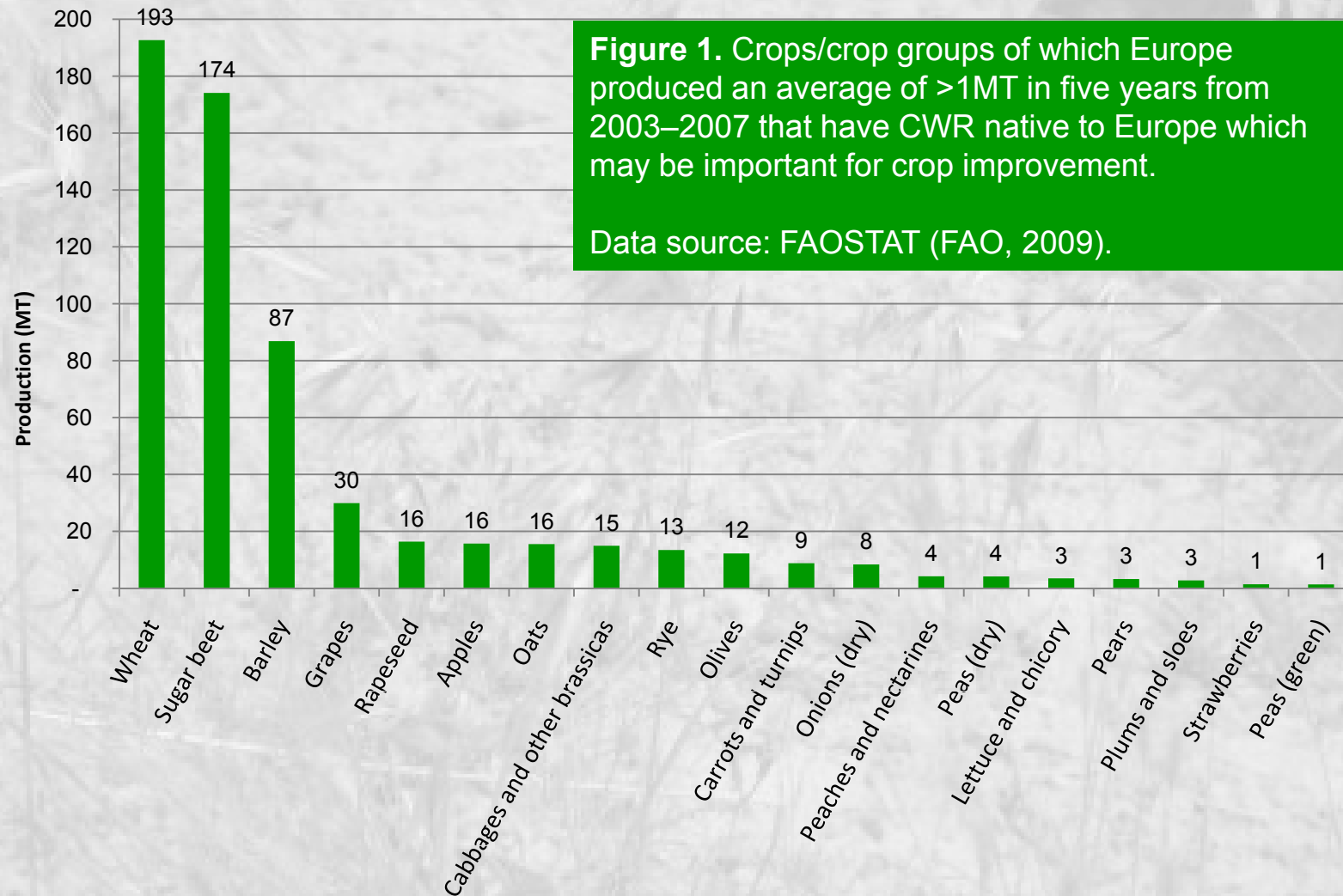
= 19,537 species

2. **Step 2:** select CWR of human and animal food crops

= 7,324 species (955 species are CWR of both human and animal food crops)

3. **Step 3:** select CWR of crops important to Europe in terms of production quantity and/or value

Selecting high priority human food crops



Selecting high priority human food crops

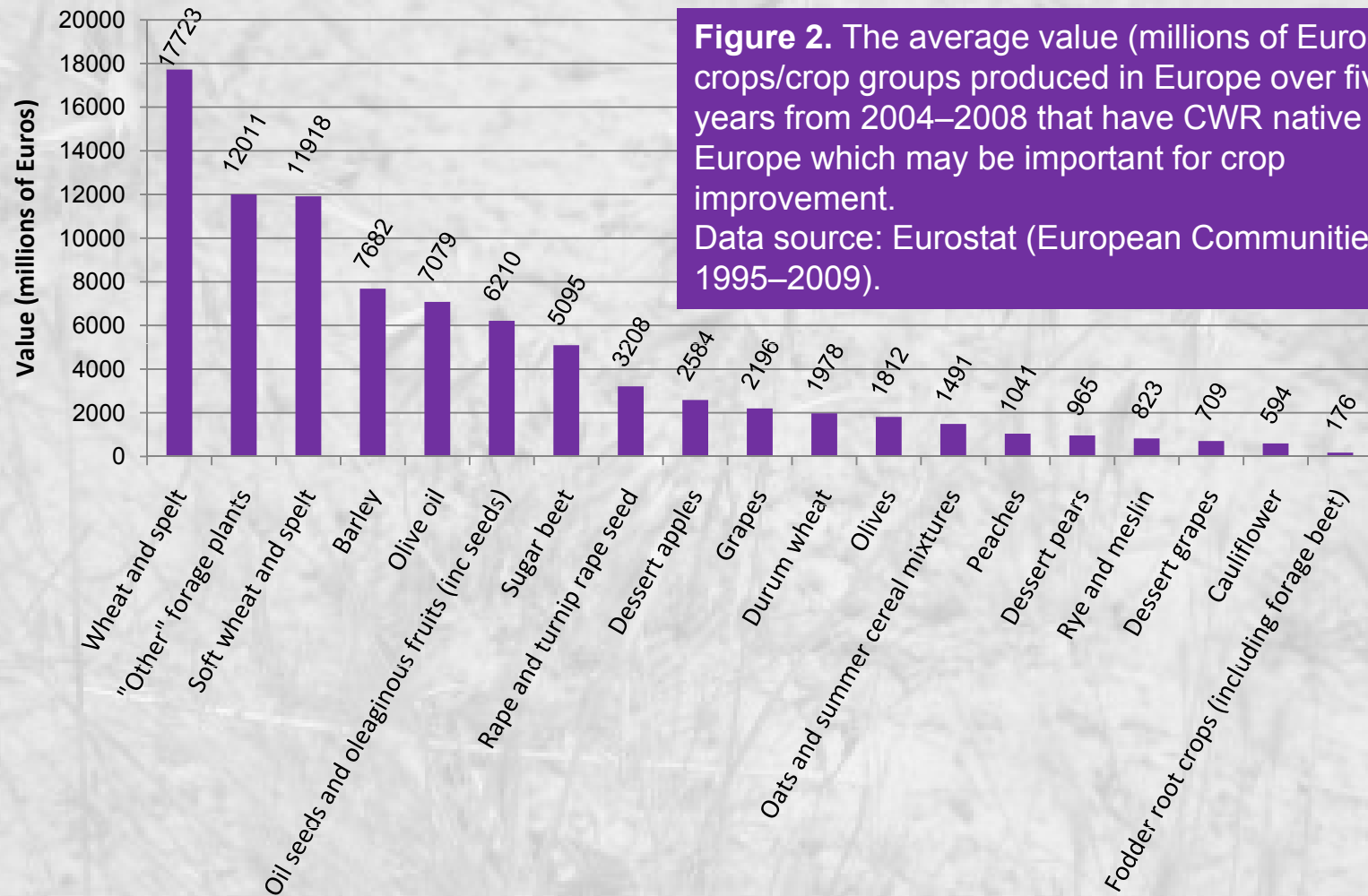


Figure 2. The average value (millions of Euros) of crops/crop groups produced in Europe over five years from 2004–2008 that have CWR native to Europe which may be important for crop improvement.
Data source: Eurostat (European Communities, 1995–2009).

European Red List: CWR selection cont'd

High priority human food crops based on production quantity and economic value

- 18 high priority human food crops/crop groups: wheat, sugar beet, barley, grapes, rapeseed, apples, oats, cabbages (and other brassicas), rye, olives, carrots and turnips, onions, peaches and nectarines, peas (dry and green), lettuce and chicory, pears, plums and sloes, and strawberries
- = **279** species in 19 genera (106 species are also CWR of forage and/or fodder crops)
- Assess all species in these genera due to their high potential economic importance
- Assessment of entire gene pools to estimate the degree of threat to European CWR both within and between gene pools

European Red List: CWR selection cont'd

4. Step 4: select CWR of crops listed in Annex I of the ITPGRFA

- Conservation and sustainable use of PGRFA and the fair and equitable sharing of the benefits arising out of their use, in harmony with the CBD, for sustainable agriculture and food security
- Establishes a multi-lateral system (MLS) for PGRFA access and benefit-sharing
- Includes 78 genera containing human or animal food crops established according to criteria of food security and interdependence
- 59 genera contain taxa native to Europe

European Red List: CWR selection cont'd

Priority human and animal food crops listed in the ITPGRFA

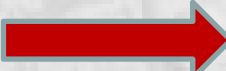

- Wheat, sugar beet, barley, rapeseed, apples, oats, cabbages (and other brassicas), rye, carrots and turnips, peas, strawberries (already included under step 3)
- Asparagus*, *Brassica* complex (*Armoracia*, *Barbarea*, *Camelina*, *Crambe*, *Diplotaxis*, *Eruca*, *Isatis*, *Lepidium*, *Raphanus*, *Rorippa* and *Sinapis*), *Cicer*, *Lathyrus* (GP1b, TG1b, GP2, TG2 only), *Lens*, wheat complex (*Agropyron* and *Elymus*) *Vicia* (mainly GP1b, TG1b, GP2, TG2)
- 52 forage species listed in the Treaty native to Europe—all included for assessment
- All *Medicago* species native to Europe

Plus five *Sinapindendron* spp. (endemic to Madeira) (*Brassica* wild relatives)

European Red List: overview of species list

Crop(s)	Genus (or genera)	No. species	Crop(s)	Genus (or genera)	No. species
Brassica complex	<i>Armoracia, Barbarea, Brassica, Camelina, Crambe, Diplotaxis, Eruca, Isatis, Lepidium, Raphanus, Rorippa, Sinapidendron, Sinapis</i>	137	Cultivated beets	<i>Beta, Patellifolia</i>	10
Onion, leek, garlic etc.	<i>Allium</i>	117	Barley	<i>Hordeum</i>	7
Legume forages	<i>Astragalus, Coronilla, Hedysarum, Lotus, Lupinus, Medicago, Melilotus, Onobrychis, Ornithopus, Trifolium</i>	92	Lentil	<i>Lens</i>	5
Wheat	<i>Aegilops, Agropyron, Elymus, Triticum</i>	35	Apple	<i>Malus</i>	5
Lettuce	<i>Lactuca</i>	27	Chickpea	<i>Cicer</i>	4
Faba bean/vetch	<i>Vicia</i>	22	Chicory	<i>Cichorium</i>	3
Asparagus	<i>Asparagus</i>	19	Strawberry	<i>Fragaria</i>	3
Grass pea	<i>Lathyrus</i>	19	Rye	<i>Secale</i>	2
Almond, peach, plum, sloe etc.	<i>Prunus</i>	16	Other forages	<i>Atriplex, Salsola</i>	2
Grass forages	<i>Agrostis, Alopecurus, Arrhenatherum, Festuca, Lolium, Phalaris, Phleum, Poa</i>	14	Garden pea	<i>Pisum</i>	2
Oat	<i>Avena</i>	13	Olive	<i>Olea</i>	2
Carrot	<i>Daucus</i>	12	Grape	<i>Vitis</i>	1
Pear	<i>Pyrus</i>	11		TOTAL	580

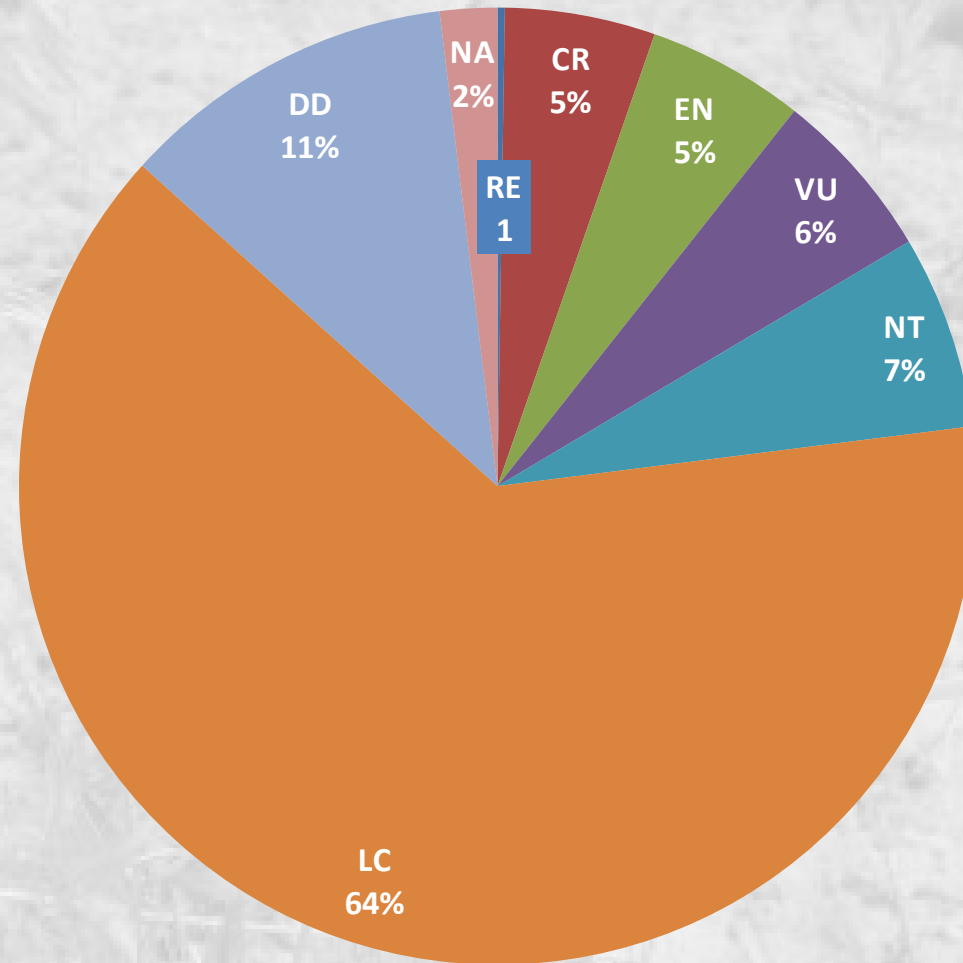
European Red List: **assessment process**

- **Collate data:** taxonomic, distribution, population, habitats and ecology, use and trade, threats, conservation actions
- **Evaluate** the taxon against IUCN Red list criteria
 - Criterion A: Population reduction
 -  Criterion B: Geographic range [**+ severely fragmented, small number of highly threatened locations, continuing decline (population and/or habitat), extreme fluctuations**]
 - Criterion C: Small population size and decline
 -  Criterion D: Very small or restricted population
 - Criterion E: Quantitative analysis (indicating the probability of extinction)
- **Select threat category:** EX, EW, RE, CR, EN, VU, NT, LC, DD, NA

European Red List: assessment process cont'd

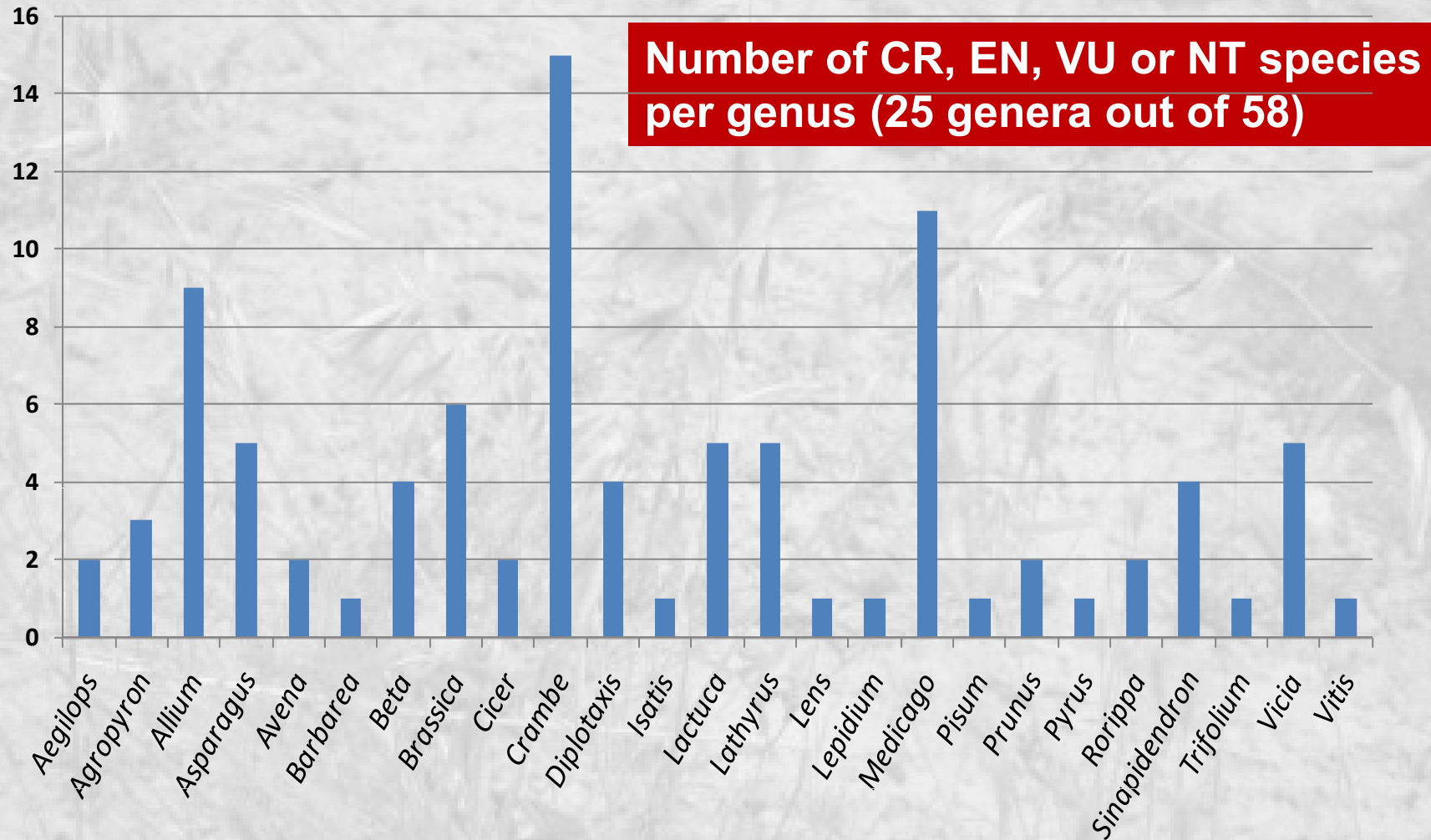
- Justify assessment (explanatory text)
- Add assessor, evaluator and contributor names
- Expert review and evaluation
- Assessments published online
- Species endemic to Europe submitted for publication in the (global) IUCN Red List of Threatened Species
- Report published online and in hard copy
- Peer-reviewed publications

European Red List: preliminary results



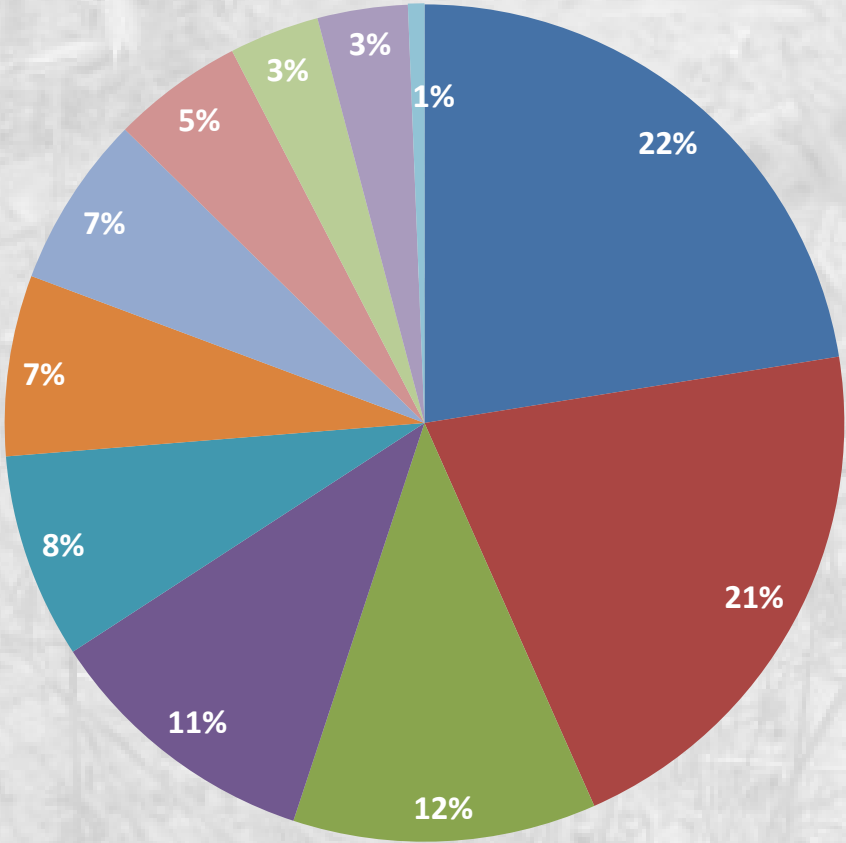
* Based on 413 regional species assessments

European Red List: preliminary results



European Red List: preliminary results

Major threats



- Agriculture & aquaculture
- Residential & commercial development
- Natural system modifications
- Invasive & other problematic species & genes
- Human intrusions & disturbance
- Climate change & severe weather
- Pollution
- Transportation & service corridors
- Biological resource use
- Geological events
- Energy production & mining

European Red List: knowledge gained and lessons learnt—positives







- Increase awareness of the importance of CWR amongst the 'nature' conservation community
- Raise conservation profile of highly threatened CWR
- Collation of a significant quantity of data useful for conservation planning
- Brings together European experts working on CWR conservation and provides training in Red Listing
- Highlights species for which more data are needed
- Provides a baseline for further assessment

European Red List: knowledge gained and lessons learnt—negatives



- Regional assessments mainly Least Concern—are these species actually of greatest concern?
- Assessments at species level—IUCN Red List criteria do not take into account intraspecific genetic diversity
- Problems of data quality and consistency
- Taxon and national experts have insufficient time (or inclination?) to contribute to Red Listing
- Application of criteria can be a bit ‘hit and miss’, depending on quality of data and opinion of assessors
- Most assessments based on criterion B, highlighting lack of population level data
- IUCN data documentation standards inadequate

European Red List: knowledge gained and lessons learnt—conservation measures

- Many species known to occur within existing PAs 
- However, most are not monitored or actively managed 
- Germplasm from European populations reported by EURISCO for 279 (48%) of species 
- However, most are represented by very few accessions, are reported by only one genebank, and have been collected from only a small part of the species' range 

European Red List: taking CWR Red Listing forward



- CWRSG can coordinate collation of global assessments of national endemic CWR species for submission to the IUCN Red List of Threatened Species
- European Red List may be developed further, providing an opportunity to add more CWR species to the list
- The usefulness of IUCN Red Listing to CWR (and all wild plant species) could (and should) be improved by considering intraspecific genetic diversity in the criteria
- This project provides a platform and justification for taking this idea forward

European Red List: acknowledgements

- Cascais Natura, Portugal for funding the CWR Red List workshop
- Melanie Bilz, Annabelle Cuttleod, Ana Nieto, Leah Collette, workshop facilitators
- Melanie Bilz for advice and support
- Ana Nieto for fund-raising for the workshop
- All the experts who have contributed to the assessments

European CWR threat assessment: **knowledge gained and lessons learnt**

Thank you for your attention!

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