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The 3rd Italian Report under art.17 of the Habitats Directive for plants: main outcomes with a focus on Adriatic coastal species

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Abstract
The Article 17 of the Habitats Directive (HD) requires that every six years Member States of the European Union report on implementation of the directive, including the assessment of the conservation status of the species and habitats of community interest recorded in the whole national territory. The 3rd Italian National Report (reporting period 2007-2012) was completed in 2013. A summary of data requested, assessment methodology and main outcomes for plant species is presented. The results show a negative status for half of the Italian plant taxa listed under HD. Critical conditions of species living in coastal areas, particularly vulnerable to human pressures, are confirmed, with unfavourable conservation status in 85% of cases. In addition for these species inadequate future prospects and decreasing trend can be expected. In this paper a survey of the status of the HD Adriatic coastal species (*Stipa veneta* Moraldo, *Centaurea kartschiana* Scop., *Salicornia veneta* Pignatti & Lausi, *Kosteletzkya pentacarpos* (L.) Ledeb.) is presented.

Key words: flora of community interest, conservation status, Directive 92/43/EEC.

Introduction

The Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora, known as the Habitats Directive (HD), aims to maintain or restore natural habitats and wild species listed on the Annexes I, II, IV and V at a favourable conservation status. For some of the habitat types and species Europe has a priority interest, meaning a particular responsibility for their protection in view of the proportion of their natural range which falls within the European territory of the Member States.

In order to evaluate the effectiveness of measures taken by Member States under HD, Article 11 requires to monitor the habitats and species, while Article 17 requires to report about status and trends referring to the whole territory of each Member State, not only to the Natura 2000 Network. A National Report must be sent to the European Commission and made accessible to the public every six year. The HD also demands that the European Commission then produce a consolidated EU Composite Report based on the national reports. With the aim to facilitate aggregation and comparisons between Member States, assessment and reporting must follow standard methodology and format.

The 3rd Italian National Report (reporting period 2007-2012) was completed in December 2013 through a collaborative work between the Ministry of the Environment, the Institute for Environmental Protection and Research, Regions, Autonomous Provinces, the main national scientific societies and several experts. The Report (Genovesi *et al*., 2014) and all data are accessible on the ISPRA website (www.sinanet.isprambiente.it/Reporting_Dir_Habitat). Database and assessments produced by all Member States are freely available at the Central Data Repository (http://bd.eionet.europa.eu/activities/Reporting/Article_17).

In the present work a survey on the 3rd Italian reporting process for plant species is presented. Data requested, methodology and some results are briefly analyzed. A special focus on the Adriatic littoral species protected under HD is proposed, with particular attention to distribution, habitat preference, threats and conservation status.

Materials and methods

The standard methodology for reporting under Article 17 attempts to ensure that Member States produce comparable results, in order to enable a better compilation and analysis of the data received at EU-level. Accurate information regarding the standard methodology can be found in the European guidelines (Evans & Arvela, 2011). A summary of the Italian reporting process for plant species is here briefly presented. More detailed information on the sources, methods and results, can be found in the specific chapter in the Italian national report (Ercole & Giacanelli, 2014).

The reporting format requires a separate analysis and assessment for each species in each biogeographical

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region of presence. Distribution and range maps have to be developed at national scale using a standard 10x10 km grid (projection ETRS LAEA 5210). For the estimation of the range a specific tool is provided by the European Commission; ranges of plants were calculated using different gap values in accordance to their various geographical and ecological features.

The reporting on plant taxa was based on the most up-dated information available, consisting in both published and unpublished sources such as checklists, atlas, etc., as well as specialized literature. Data from Regions and Autonomous Provinces were also gathered, with the technical coordination of ISPRA. An additional source of information derived from the project for the Red List of the Italian flora, carried out by the Italian Botanical Society (Rossi *et al*., 2013a; 2013b). Moreover, for a set of 44 species, a significant contribution came from regional flora experts who were involved in the work.

The methodology requires a large amount of information (quantitative data and/or estimates) on specific parameters (range, populations, habitat for the species, threats) and the evaluation of Favourable Reference Values (FRV). It is required to identify threshold values (FRRange and FRPopulation) to determine if the parameter is in a favourable or unfavourable status. Determining these values is not easy. At present quantitative data for FRV are still lacking and the comparison between FRV and current situation was made, as allowed by the guidelines, on the basis of the experts judgment.

With regard to population, an estimation of the number of individuals is primarily requested, even if alternative units are allowed. In this reporting for 29 plant species the number of individuals could be provided; number of localities were chosen as alternative unit for 22 taxa and number of grid cells in the remnant cases. The parameter "habitat for the species", as defined in Art.1 of HD ("an environment defined by specific abiotic or biotic factors, in which the species lives at any stage of its biological cycle") is one of the four parameters used to assess conservation status. The reporting format asks for the area occupied in kmq, information that is currently lacking for plant taxa; thus only the fields concerning habitat quality and trend were filled. It should be remind that the reporting system does not require any indication about ecology and habitat type. For each species pressures (factors acting now or have been acting in the last 6 years) and threats (future/foreseeable impacts affecting the long term viability of the species) selected from a hierarchical list were provided.

The conservation status (CS) takes into account the state of range, population, habitat for the species and future perspectives, evaluated considering the likely future status and trends, dependent on threats (negative influence) and, on the other hand, on conservation measures (potential positive influence). The CS must be expressed through one of the following categories: favourable (the species can be expected to prosper without any change to existing management or policies); unfavourable-inadequate (a change in management or policy is required to return the species to favourable conditions, but there is no danger of extinction in the foreseeable future); unfavourable-bad (for species in serious danger of becoming extinct, at least regionally); unknown.

With the aim to focus attention on the Adriatic coasts the list of plant species reported for Italy was first analyzed to identify the typically coastal taxa. Selected species must have distribution restricted (or largely so) to coastal ecosystems, particularly dunes, salt marshes and coastal lagoons, cliffs and rocky slopes under salt spray. Within this subset, attention was then focused on species of the Adriatic coasts. A synthesis of habitat preference, major impacts and CS was elaborated on the basis of reporting results and other published sources.

Results

The 3rd Report for flora was conducted for 107 taxa (96 vascular, 10 bryophytes, 1 lichen). In fact, of the 113 plants of the official list for Italy, 4 were recently signed as Not-Present in our territory (A*splenium hemionitis* L., Centranthus trinervis (Viv.) Bég., *Colchicum corsicum* Baker, *Myosotis rehsteineri* Wartm.) and 2 as extinct, *Aldrovanda vesiculosa* L. and *Caldesia parnassifolia* (Bassi ex L.) Parl., respectively RE(Ex) and CR(PEx) (Rossi *et al*., 2013a). Distribution patterns vary from wide, to very narrow and punctiform: 49 species are restricted to only 1 of the Italian Regions, 11 of which occur in only 1 grid cell. 50% of all CS-assessments resulted unfavourable (inadequate or bad) and the percentage grows to 65% if only species on Annex II are considered. These percentages are also reflected in the future perspectives.

Among the Italian HD plant taxa, 27 (26 vascular, 1 bryophyte) grow in coastal ecosystems, such as sand dunes, salt marshes and lagoons, garrigues and thermomediterranean scrublands, coastal cliffs. Some of these species have their optimal habitat and main distribution in coastal areas, but can also grow in inland sites (e.g. *Campanula sabatia* De Not. and *Dianthus rupicola* Biv.). Most of them refer to the Mediterranean Bioregion (see figure 1), with the highest number (19 species) in Sicilia, Sardegna and small islands (Egadi, Eolie, Pelagie, Maddalena Archipelago, Asinara, San Pietro). Peninsular coasts facing Tyrrenian Sea host 1 species in Liguria and 3 along the southern Tyrrenian coastline. Only 4 species refer to Continental Bioregion, growing along the northern part of Adriatic

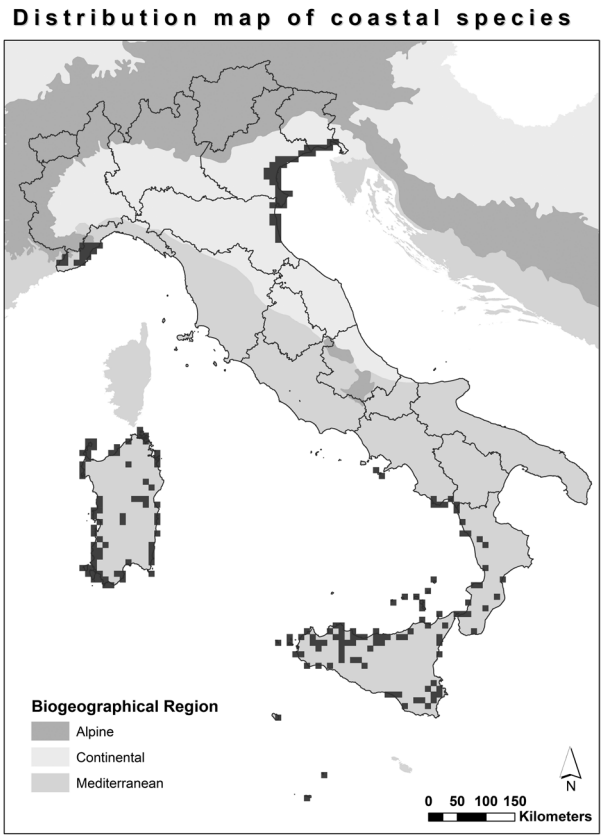

Fig. 1 - Distribution of the 27 plant taxa of community interest (Ann. II, IV, V Dir. 92/43/CEE) living in coastal ecosystems (10x10Km grid cells).

Sea, from Emilia Romagna to Friuli Venezia Giulia.

HD species of coastal ecosystems show a particularly high rate of endemism (78%): 17 species are exclusive of our territory, 3 Sardo-Corsican endemic and 1 species is restricted to Linosa Island (Sicily) and Malta (Peruzzi *et al*., 2014). Many of them have very localized and punctiform distribution. CS-assessments for coastal species resulted unfavourable in 23 cases (85%), 20 of which inadequate and 3 bad. Even more a future decreasing of the CS seems to be predictable for 19 of them.

The situation is not better also considering the only 4 Adriatic coastal species. These four species of Annex II grow in different habitat: *Stipa veneta* Moraldo is an endemic species of priority interest typical of grey dunes of Veneto and Friuli Venezia Giulia; *Centaurea kartschiana* Scop. is a restricted endemite of the coastal cliffs near Trieste; *Salicornia veneta* Pignatti & Lausi, species of priority interest, and *Kosteletzkya pentacarpos* (L.) Ledeb. live in lagoons and salt marshes, the latter with a broader distribution also outside the Italian boundaries.

In the following, a survey of the status of these species is presented.

Stipa veneta grows in the grassland open communities of the grey dunes referring to the association *Teucrio capitati-Chrysopogonetum grylli* Sburlino, Buffa, Filesi et Gamper 2008 (order *Scorzonero-Chrysopogonetalia* Horvatić et Horvat in Horvatić 1958) (Sburlino *et al*., 2008, 2013). It is endemic to northeast Italy (Veneto and Friuli Venezia Giulia coasts), where it occurs in few, severely fragmented locations (Fig. 2). The CS of *Stipa veneta*, assessed in the context of the reporting, is unfavourable-bad, mainly due to limited population size and bad status of its habitat. The trends of range, population and habitat for the species are decreasing, especially because of the degradation of the sandy coastal habitats in the northern Adriatic and the strong contraction of the distribution area. However, natural fires of the wood helped this species to expand one of its population to over thousands of individuals (Lignano-Udine). *Stipa veneta* is threatened by habitat loss and degradation, tourism, invasive non-native species, but also by species composition change (succession).

Centaurea kartschiana is a very local endemic, restricted to limestone coastal cliffs between Duino and Aurisina near Trieste (Fig. 3), growing in the communities of the association *Campanulo-Centaureetum kartschianae* Lausi et Poldini 1962. Its habitat occupies few meter between the shore and cliffs with subalophilous species and the sunny rocky vegetations with *Euphorbia wulfenii* Hoppe. *Centaurea kartschiana* lives in an endemic-rich habitat, which has been proposed as an independent habitat for the inclusion in HD Annex I (Poldini *et al*., 2007). The distribution map in figure 3 shows the extremely narrow distribution of the species (only 1 grid cell 10x10Km), reported in few locations with an estimated population of 200-250 individuals (Aa.Vv., 2010).

The current CS of *Centaurea kartschiana*, assessed in the frame of Article 17 methodology, is unfavourable-inadequate, but with a stable trend. The species grows on cliffs and rocks and is mainly threatened by

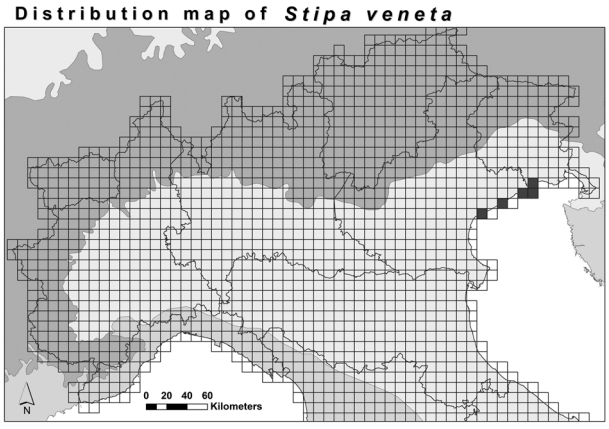

Fig. 2 - *Stipa veneta* Moraldo, endemic species of priority interest (Adriatic coasts: VEN, FVG).

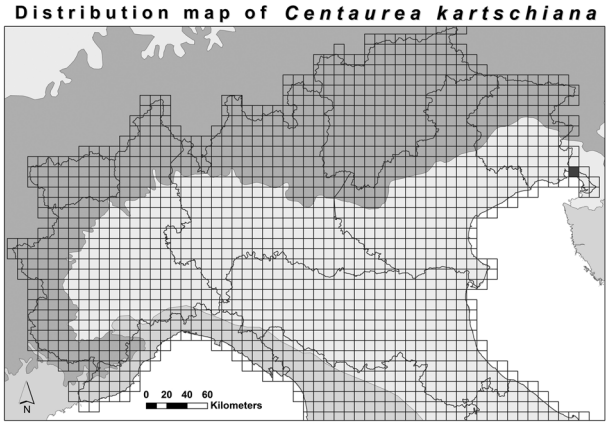

Fig. 3 - *Centaurea kartschiana* Scop., endemic species (Adriatic coasts: FVG).

impacts from leisure activities and tourism. Nevertheless it seems to be able to colonize also disturbed habitats showing an apophytic behavior.

Salicornia veneta, described for the Venice lagoon (Lausi, 1969), is a doubt species inside the group of *Salicornia procumbens* Sm. in Sowerby subsp. *procumbens* (Šajna *et al*., 2013). Previously recorded also for Slovenia and Croatia, the species was in the last years excluded from both of the countries (Kaligarič *et al*., 2008; Šajna *et al*., 2013). In Italy *Salicornia veneta* is manly distributed from Emilia Romagna to Friuli-Venezia Giulia (interesting 40 grid cells of the Continental Bioregion, Fig. 4) with a disjunction of one locality (1 grid cell in the Mediterranean Bioregion) in centre-western Sardinia in S'Ena Arrubia lagoon (Conti *et al*., 2005; Arrigoni, 2006; Filigheddu *et al*., 2000).

Lausi (1969) in the original description of the species noted that "seems ecologically restricted on the muddy and lower parts of the clayey banks of the lagoon called barene". In addition the species can live in wet brackish environments, on muddy beaches and salt marshes, without long desiccation period, and often in contact with *Spartina maritima* swords. The species gives name to the association *Salicornietum venetae* Pignatti 1966. The assessment of *Salicornia veneta* resulted in a favourable CS with stable trend. Main future threats can derive from drainage activities and modifications of water quality and salinity.

Kosteletzkya pentacarpos lives in the coastal lagoons, brackish and fresh water marches, on the banks of streams and other wetlands. The global area of distribution of the species goes from eastern Spain to SW-Russia (Nogueira & Paiva, 1993). In Italy the species is currently present in six sites along the coast of Veneto (Cavallino-Treporti, Venice, Po-Valle Cannelle, Caorle lagoon) and in one site recently discovered in Emilia Romagna (Po di Volano, Ferrara) with a population of 15 individuals (Ercole *et al*., 2013); all sites fall within 5 grid cells 10x10Km (Fig. 5).

The results of the 3rd report for *Kosteletzkya pentacarpos* indicate an inadequate CS in Continental Region with inadequate future prospects and decreasing trends. The report has also highlighted the extinction of the species from the Italian Mediterranean Region, because it has been no longer found in Toscana, Lazio, Campania and Puglia (Tomei & Pistolesi, 1980; Tomei *et al*., 1985; Tomei & Guazzi, 1993; Motti & Ricciardi,

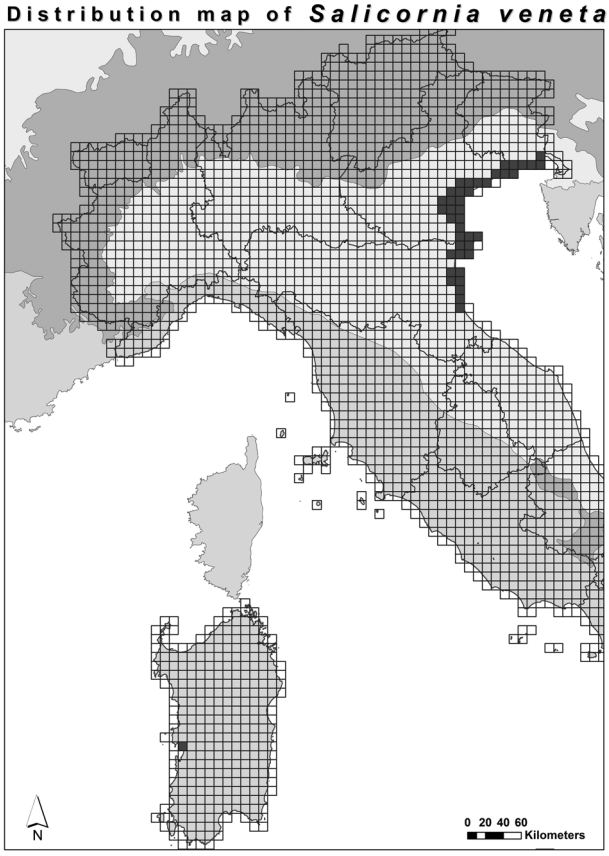

Fig. 4 - *Salicornia veneta* Pignatti & Lausi, species of priority interest (Adriatic coasts from EMR to FVG; SAR).

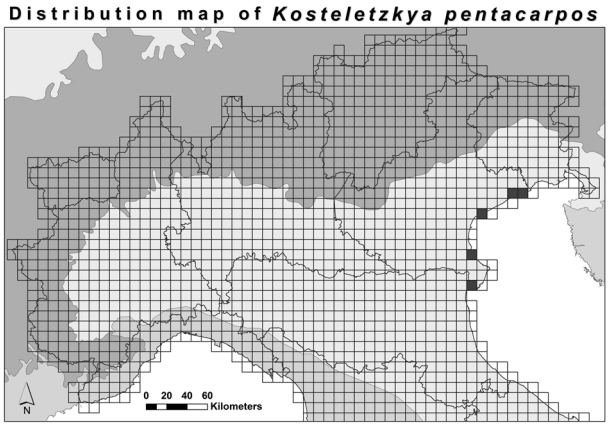

Fig. 5 - *Kosteletzkya pentacarpos* (L.) Ledeb. (Adriatic coasts: EMR, VEN).

2005; Ercole *et al*., 2013). In fact many populations of *Kosteletzkya pentacarpos* reported in '800 and in the first decades of the '900 (Bientina di Pietrasanta, Piana Pontina, Fogliano, Monaci, Caprolace, Fusaro and Licola lakes) disappeared. Afterwards, in the past few decades, it has not been found even in the more recent sites of presence (Mesola woods, Fondi and Lesina lakes). The species is threatened mostly by land reclamation and drying out, management of vegetation and invasion of alien species. Agricultural intensification, abstractions from groundwater and pollution of surface waters are also regarded as threats.

Conclusion

The 3rd Italian Report under Article 17 of the Habitats Directive reveals rather negative assessment for our flora of community interest. The overall results indicate a negative conservation status for about half of all plants and the situation is worse for coastal species, 85% of which are in inadequate or bad conditions.

In Italy the high number of HD plant species, combined with the particularly elevated rate of endemism (about 50%) underlines a special responsibility of our country in terms of protection of plant biodiversity of the European Union. Coastal species, with a rate of endemism of 78%, are particularly significant in this regard.

Despite advances in terms of knowledge during the last decades, a certain heterogeneity in different areas of our territory remains and there are still information gaps and lack of data for some parameters requested by the Directive (i.e. number of individuals, short and long-term trends). Future research activities and monitoring programs would be essential to fill these gaps and to address some key aspects of the reporting method such as favourable reference values and habitat for the species.

The severe level of pressures affecting our country (habitat fragmentation, inadequate agricultural and forestry practices, urbanization, drainage and other ecosystem modifications caused by man) stresses as well the application of strict conservation measures and the importance of ensuring adequate monitoring activities, focusing on the species and habitats in most critical conditions, like those of coastal ecosystems.

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