

## DATA SHEET MODEL FOR DEVELOPING A RED LIST REGARDING CROP LANDRACES IN ROMANIA

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### Abstract

*A data sheet model this paper is proposing that will be required for developing a future Red List for crop landraces in Romania. Such a Red List is not yet published in our country and the genetic erosion for crops is increasing especially because of the pressure of commercial crops entering the market-place and also because of the climate change and desertification as major threats. As a consequence for safeguarding food and feed it is compulsory to preserving genetic resources and a special attention should be devoted to on farm conservation. Developing a red list for crop landraces in Romania will support further on farm conservation of such crops and will more emphasize the role of gene banks in our country. Furthermore such a red list will ground the development of a new agriculture vision and policy regarding the implementation of appropriate incentive measures for supporting on farm conservation of crop landraces in specific area in Romania such is the protected area system.*

Keywords: red list, data sheet, crop landraces

### 1. INTRODUCTION

In Romania different pressures regarding the crop landraces disappearance exists including the market pressure determined by high commercial crops and this phenomenon comports some peculiarities in Romania regarding crops genetic erosion which even it was identified 30 years before [15, 19] except the ex situ conservation from Gene Bank Suceava no specific measures are in place today. Thus, lot of farms located in Transylvania especially within the protected area boundaries, preserved their ancestor heritage represented by these landraces. This is the case of cabbages, beans, potatoes, vines, raspberry, cereals, etc. Such landraces should become the subject of developing a red list for developing a future agriculture policy including Research & Development. Thus, based on criteria developed earlier by IUCN red lists for threatened wild species are already in common use all over the world [13] and are already published in Romania too [2, 6]. We should mention that even biodiversity as a concept developed by the Convention on biological diversity includes agricultural biodiversity [7], for crops plants still similar approaches have been developed ten years later and only in few

countries [11, 14]. Developing and adopting such red lists is a milestone in the action taken for fighting against the biodiversity loss and for agriculture such loss is tremendous especially because of economic reasons [3], and lately also because of climate change and desertification pressures [1, 8]. On the other hand genetic erosion is the common threat to the sustainable use of plant genetic resources to meet the needs and aspirations for future generations [5, 16, 18]. Thus, even the term genetic erosion was originally used for crop plants and scientists are aware about that threat, it became more important for the scientific community later at least from this point of view and we may add that this is mostly concerned with the rapidly disappearing landraces (i.e. at the infraspecific level) with their important quality and resistance characters, rather than the loss of entire species of crop plants [9-12, 16].

This article is proposing a specific methodology for developing a data sheet model for landraces as a prerequisite for red list development. We would underline that the proposed methodology is supporting the need for *on farm* conservation and based on the future published red list it will be possible to implement an appropriate *on farm* conservation

strategy through a synergic approach between landscape conservation, climate change and biodiversity conservation for food/feed safeguarding.

## 2. MATERIAL AND METHODS

The data sheet model for describing the status of conservation of old crop varieties is based on the methodology described by Hammer and coworkers starting with 1991 [9] which is developed based on the Red List developed earlier by IUCN [13]. Also we are taking into account the specificity of the Red List regarding the vascular plants in Romania and certain peculiarities related to the landscape approach at the local level.

Based on this methodology and according to the IUCN Red List, the Crop Red List for Romania data sheets describing crop landraces will be arranged alphabetically in the same manner such as for the IUCN Red List of Threatened Plants and also correlated with the public database developed by the Gene Bank from Suceava.

## 3. RESULTS AND DISCUSSION

Developing a data sheet model for describing the crop landraces in our country is a very important step in the process of adopting a Red List for the crop landraces. For this purpose we are taking into account some important features and as a consequence we are proposing a series of entering data points for including specific data such as follows:

1. *Scientific name of species* – at this line we are including the scientific name of the species for which this landrace is belonging, author name and family all in Latin language. This is in line with the IUCN requirements;

2. *Common name of the species* – this line include the landrace common name

*Landraces list* – This is a very specific part of the Red List because it is very difficult to address the infraspecific level. Thus for a certain species a single one or many landraces are possible to exist. At this line it will be mentioned the numbers of investigated

landraces starting when it will be possible with the “variety name” after validation followed by the locality names because under the same variety name it might be possible also to have different landraces. The species name will be directly followed by the name of the identification locality if some identified landraces will not be recognized as “varieties”. If there are published genetic analyses at the national level they will be mentioned for the specific crop in order to provide an image in regard with the needs for research. In this case the landrace name is accompanied by the name of the scientist/ scientists validating it.

*Image* – at this line also photographs will accompany the landrace name regarding either seeds either the most representative parts of the crop plants.

3. *Status of conservation* – under this entering point the status of conservation of landrace/ landraces will be described according to our proposed methodology as following:

- *Extinct on farm (ExF)* - crop landraces exists only in gene banks; *Extinct (Ex)* -crop landraces are not anymore used in farming and are missing from the Genebank – Suceava. According to Hammer and Khoshbakht [12] citing the IUCN (1994), all the species of *Triticum* belong to the subcategory *Extinct in the wild* which means for crop plants ‘not existing in gardens or fields’ (i.e. *on farm*);

- *Endangered on farm (EF)* - crop landraces are conserved *on farm* into subsistence farming system in few locations - not correlated for the landscape approach; not commercialized and not promoted; According to Hammer and Khoshbakht [13] most of the species of this category are not highly domesticated and it is presented the case of *Vicia articulata*, an extremely rare crop in the Mediterranean [17] which could be found recently only in one small field in Sardinia;

- *Endangered for ex situ (EE)* (crop landraces are still conserved into GeneBank Suceava or other research institute - on voluntary basis);

- *Vulnerable on farm (VF)* (crop landraces are conserved *on farm* into subsistence farming system, farmers are

committed for commercialization and exists more locations not correlated into the landscape approach for cultivation and no policy or financial programmes are in place). According to Hammer and Khoshbakht [12] this is the second largest group of threatened crop plants in the world and highly domesticated crop plants are rare, here. According to Hammer and Khoshbakht citation [12], *Rubus pascuus* from Maryland and *Rubus velox* from Texas were domesticated as fruit shrubs in the United States. *R. pascuus* was known as the cultivars ‘The Topsy’ and ‘Tree blackberry’, and the derived ‘Naticope’ is still successful. The older cultivars have become rare because new *Rubus* species have been introduced. The same is true for the old varieties of the Mac-Donald blackberry (*R. velox*), but also the wild species are under threat because of the introduction and spread of new *Rubus* species and cultivars and relatives in the wild areas. The dynamics of this process has been show recently in Italian blackberries *Rubus ulmifolius* Schott and others. Under this category we may introduce the *Rubus ideus* landrace from Romania domesticated centuries ago by Saxons and now it is resident in Saxon villages from Transylvania (Fig. 1);



**Figure 1** *Rubus ideus* L., landrace of Saxon origin from Moşna, Sibiu county Romania

- Vulnerable for ex situ conservation (VE) (these crop varieties are conserved only into ex situ under special conservation programmes);

- Rare crop plants According to Hammer and Khoshbakht [12], this is the largest group which includes many fruit trees (*Garcinia mestonii* from Australia, *Grias peruviana* from

South America, *Gustavia dubia* and *Gustavia nana* from Panama to Northern Colombia, *Lecythis ollaria* from central Venezuela, etc.).

- Least concerned – (LC) (it is a low risk but *on farm* conservation is supported by the well organized local communities level and farmers are committed for commercialization (crop landraces are conserved *on farm* and there is implemented an landscape approach);

- Indeterminate (I) – data are not yet evaluated.

7. *GeneBank Passport no.* – An alphanumeric number provided by the Gene Bank from Suceava is listed such as XXXXX (e.g.: 4014 is the passport no. of *Phaseouls vulgaris* registered into the data base of Gene Bank Suceava);

8. *Chorology* – the locations where the landrace was identified will be alphabetically ordered. This line will be accompanied by maps and the locations will be marked by dots. The scope of this entering data point is rather to underline the need for increasing awareness because such crops may become cultivated more extensively in order to improve their status of *on farm* conservation (Fig. 2).

9. *Protected areas* – if the landrace is cultivated into protected areas these protected areas will be mentioned as officially they are recognized also on the map image as a contour line in order to emphasize the presence of *on farm* system into protected areas;



**Figure 2** A blank map example

10. *Human – animal conflicts* – at this line it will be described if this landrace is located in such areas and problems should be quantified in percentage of lost landrace's yield. This entering data point is important for protected areas and neighboring where traditional farming may have an impact into wild protection. When such problems will appear the map described at the line no. 8 will figure also this characteristic;

11. *Surface area for cultivation* – under this line it will be introduced significant data regarding cultivated area, media for cultivation per year/per location. Also it is important to mention the type of farming such as subsistence or commercial farming;

12. *Culture characteristics* – this line is shortly describing some important features for cultivating these landraces (e.g. beans need warm soil for best germination. Plant seeds in spring or in summer about 2.5 cm deep and 20 cm apart or in basins);

13. *Seed saving* – under this entering data point we propose to introduce data regarding the seeds origin (e.g. locality name or names);

14. *Barriers* – under this line shortly will be presented the main barriers in maintaining the status of conservation of this landrace;

15. *Landscape units identified* – under this line the main landscape units are described including characteristics such as *suitable for drought/ wet land/ arid/ semiarid cultures* very important feature for identifying landraces suitable from climate change and desertification point of view. This line is very important for the landscape approach of the subject.

16. *References* – this entering point includes specific scientific citations.

17. *Authors* – includes scientist names involved in data sheet elaboration

The section bellow line no 4 will be completely filled in for each crop landrace belonging to one species. Thus, only if genetic molecular approach is characterizing a certain crop landrace based on specific locations will be developed.

#### 4. CONCLUSIONS

Developing a data sheet model for describing the status of conservation of crop landraces is one of the main steps in process for developing a Red List. Such a data sheet will uniform the content of information describing the status of conservation for each landrace crop and will rapidly guide readers and researcher to understand more regarding the landrace distribution, importance of on farm conservation and the need for developing appropriate incentive measures especially dedicated for protected areas.

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