5 = PRELIMINARY COMPARISON OF THE DEVELOPMENT OF SPONTANEOUS VEGETATION BETWEEN DEGRADED SOILS AND RECONSTITUTED ONES (PIACENZA, ITALY)

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1. INTRODUCTION

1.a DESERTIFICATION

It is a complex process of progressive loss of soil fertility due to soil exploitation, that causes alterations of its physical and chemical properties.

Nowadays it is one of the most critical worldwide issues, that many policies and researches are trying to contrast through new technologies and new approaches.

1.b RECONSTITUTION

It is an innovative technology (patented by the company **MCM ECOSISTEMI**) of mechanical and chemical treatments applied to degraded soils.

This process affects the structure and the amount of organic matter, to create soils with better agronomical properties.
The efficiency of this technology is tested with the project called *New Life*, LIFE10 ENV/IT/000400, which is co-funded by the European Union.

TO COMPARE THE NATURAL SUCCESSION OF SPONTANEOUS VEGETATION BETWEEN DEGRADED SOILS AND THEIR RESPECTIVE RECONSTITUTED ONES 28 plots have been created in 2013.

These plots are divide in 3 groups according to the degraded soil origin.

GROUP N. 1, CODE PSC1	GROUP N. 2, CODE PSC2
Total plots 10 5 plots of degraded soils 5 plots of reconstituted soils The degraded soils origin from the landfill. SOIL CODE: F,G,H,I,L	Total plots 12 4 plots of degraded soils 8 plots of reconstituted soils Soil with four different textures (sand, silt and 2 kind of clay) SOIL CODE: A,B,C,D

GROUP N. 3, CODE PS
Total plots 6 1 plot of degraded soil 5 plots of reconstituted soils. The degraded soil is a cultivated one. SOIL CODE: E

2. MATERIALS AND METHODS

2.1 VEGETATION:

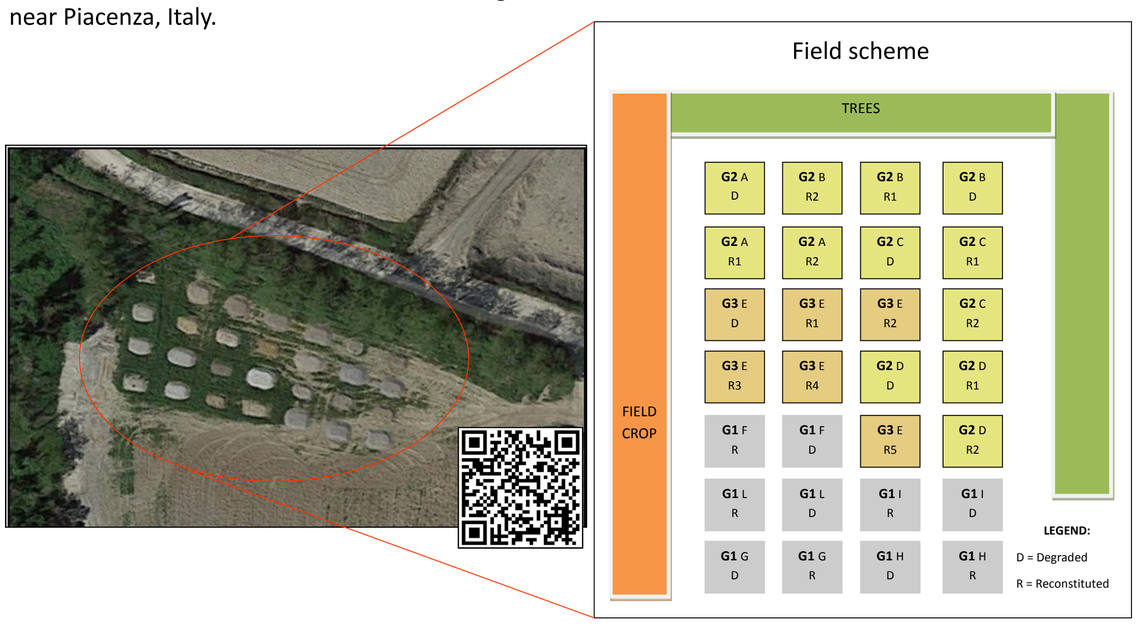
- **140 Phytosociological relevés** (according to the Zurigo-Montpellier school).
- **Sampling:** every month from June to October 2014.

2.2 SOIL:

- **Chemical and Physical analysis** (standard analysis according to the *Gazzetta Ufficiale della Repubblica Italiana*).
- **Sampling**: between September 2013 and June 2014.

3. STUDY AREA

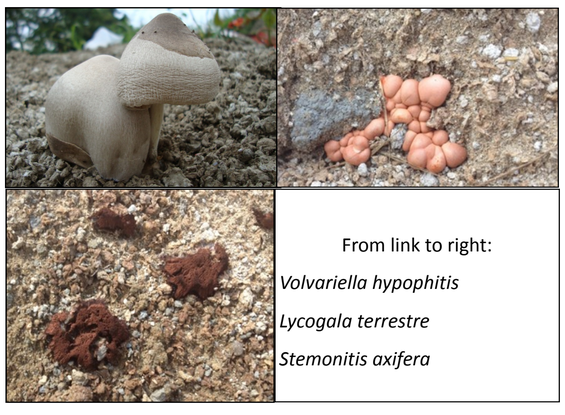
Plots are located in a RURAL AREA in Gossolengo, near Piacenza, Italy.



4. RESULTS and DISCUSSION

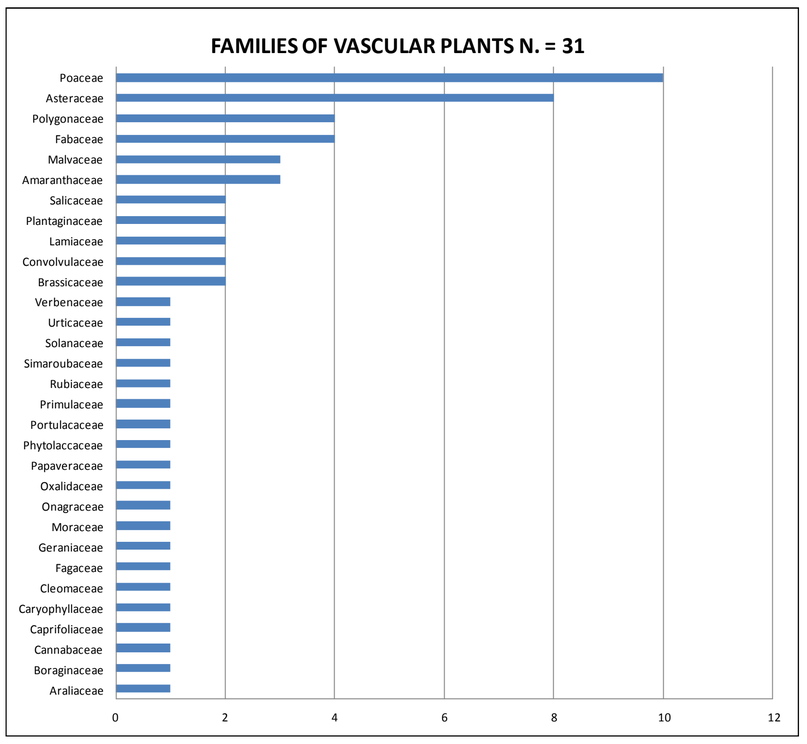
4.1 FLORA

- 71 species were found during the sampling.
- 67 of them belong to vascular flora;
- 1 belongs to *musci;*
- 2 are *myxomycetes*: *Lycogala terrestre*, *Stemonitis axifera*
- 1 is a *basidiomicetes* *Volvariella hypophitis*.



From link to right:
Volvariella hypophitis
Lycogala terrestre
Stemonitis axifera

4.2 ECOLOGY



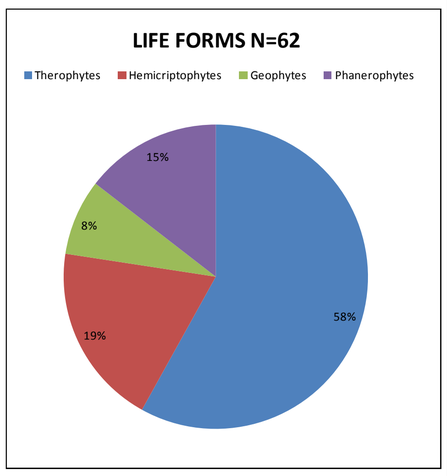
POACEAE is the most important family and TEROPHYTES is the most common biological form
e.g. *Chenopodium album*.

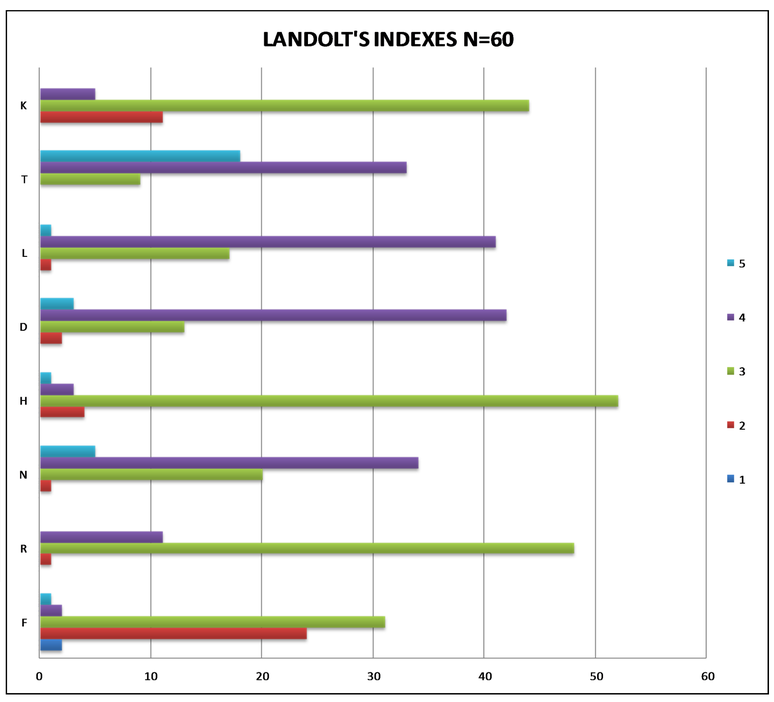
GEOPHYTES present high values of coverage and sometimes they are the dominant life form even if their low number of species.
e.g. *Cynodon dactylon* and *Sorghum halepense.*

According to LANDOLT's INDEXES, a lot of species are typical of bright habitats (e.g. *Convolvulus arvensis*) and typical of nitrofile substrates e.g. *Abutilon theophrasti* and *Amaranthus retroflexus*.

Pioneer PHANEROPHYTES have been observed: e.g. *Populus nigra*, *Salix sp.*, *Robinia pseudoacacia*, but also *Quercus pubescens*.

All these conditions are usual of a PIONEER STADIUM of a SECONDARY SUCCESSION





4.3 VEGETATION COVERAGE

GROUP 1, CODE PSC1										
Month	F d	F r	G d	G r	H d	H r	I d	I r	L d	L r
Jun	1	*	1	*	1	*	1	1	1	*
July	3	1	1	*	4	*	2	2	1	*
Aug.	5	1	4	*	5	1	5	3	5	*
Sept.	5	2	4	1	4	2	5	3	4	2
Oct.	5	2	3	1	3	4	4	4	4	2

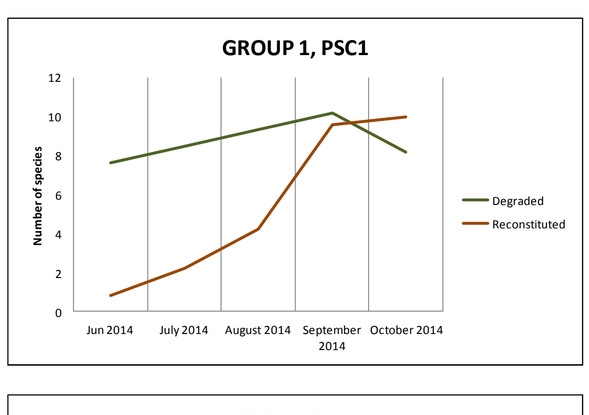
GROUP 2, CODE PSC2												
Month	A d	A r 1	A r 2	B d	B r 1	B r 2	C d	C r 1	C r 2	D d	D r 1	D r 2
Jun	1	*	*	1	*	1	1	*	*	1	*	*
July	2	1	1	1	1	1	2	*	1	1	1	1
Aug.	2	1	.	2	1	1	4	*	1	1	1	.
Sept.	3	2	1	3	1	1	3	1	3	1	1	1
Oct.	3	1	1	2	1	1	2	1	2	1	1	1

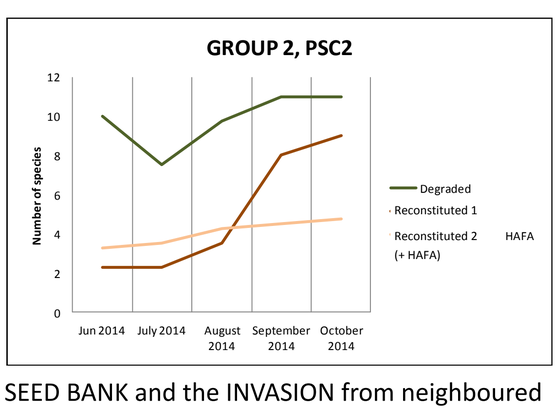
GROUP 3, CODE PS						
Month	E d	E r 1	E r 2	E r 3	E r 4	E r 5
Jun	1	1	3	1	1	*
July	2	2	4	1	1	*
Aug.	3	2	5	3	1	1
Sept.	3	3	5	3	1	1
Oct.	3	3	5	4	1	1

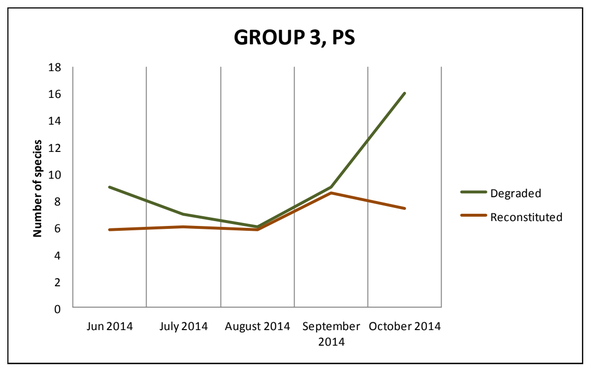
LEGEND : coverage % values are divided in 6 classes

- ***:** <1 %; **1**: 1%-20 %;
- **2** : 21-40 %; **3** : 41-60 %;
- **4** : 61-80 %; **5** : 81-100%

4.4 RICHNESS (average number of species)







SOIL SEED BANK and the INVASION from neighboured vegetation source (especially for phanerophytes) are two very important conditions that have driven the colonisations in this first year.

According to richness and coverage comparison, the colonisation of plots appears faster on degraded soils, despite the short period of sampling.

Perhaps it is due to a different condition of the seed bank that reconstitution treatments may have reduced on reconstituted soils.

Further analysis are in progress to investigate seasonal fluctuations and succession development.

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