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**DINAMICA DI VEGETAZIONE IN AREE DI POST ABBANDONO  
DELLA PIANURA PADANA**

BIO/03

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## ABSTRACT

### VEGETATION DYNAMICS IN ABANDONED FIELDS IN THE PO PLAIN (ITALY)

Human impact and the mechanization of agricultural activities have deeply modified the natural landscape in the Po plain (northern Italy), as well as in other countries. Forest vegetation in this area has strongly declined since the Neolithic (CASTELLETTI E ROTTOLI, 1998), with subsequent modifications of forest structure and floristic composition. Nonetheless, the recent decrease of agricultural pressure has enhanced the development of postcultural vegetation dynamics, allowing us to start an examination the vegetation dynamics in the Po plain.

In order to identify the dynamic series of the Po plain area, we have analyzed the secondary vegetation dynamics in sample abandoned fields of the upper plain of Milan and Lecco and woody communities of the Gera D'Adda neighbourhood (Bergamo) which, in dynamical terms, represents the final stage of the series.

The first case-study concerns the area of Rio Vallone Plis (Milan), which measures 1181 hectares and is located in the Pleistocene and Holocene alluvial sediments of the upper Po plain. The chronosequence or space-for-time substitution approach (PICKETT, 1989; FOSTER & TILMAN 2000) was applied to examine the temporal changes in vegetation. The method included the collocation of relevés in sites of different – preferably known– age at given time intervals, assuming that the samples would represent the distinct stages of a temporal series. The historical study was realized by comparing orthorectified aerial photographs taken in different years (1954, 1980, 1998, 2003, and 2006). Fifty-six relevés were made by using the phytosociological approach (BRAUN – BLANQUET, 1932; WESTHOFF & VAN DER MAAREL, 1973). Two matrices (relevés/species, Landolt ecological index average values/cluster) were constructed from the resulting data set, in order to analyse the relationships between ecological variables and the different clusters of vegetation. Matrices were processed separately through a multivariate analysis approach (PCA) using the SYN-TAX 5.0 software (PODANI, 1995). The third matrix (relevés/life forms) was processed in order to analyse the relationships between life forms abundance and the age stage of the studied sites, through ANOVA analysis with the SPSS 10.0 software and later analysis by means of *Pearson* a 2-code correlation.

Nomenclature of taxa, corological elements and life forms follow PIGNATTI (1997) and AESCHIMANN & AL (2004).

Two main series of secondary succession were distinguished according to their environmental and soil conditions: (a) the acidophylous series of middle Pleistocene terrace (Mindel *Auct.*) develops from the first herbaceous nitrophyllous stage, belonging either to *Chenopodium glauci* (igrophyllous variant) or *Daucopicridetum hieracioidis* (mesoxerophyllous variant), to a second herbaceous-shrubland stage, which can be referred to either to *Convolvulo-Eupatorietum cannabini* (igrophyllous variant) or *Convolvuletalia sepium* (mesoxerophyllous variant), to a third forest-edge stage that can be attributed to shrubland communities *Prunetalia spinosae*, and eventually to the last stage, which is represented by wood referable to *Quercetalia robori petraeae*. The regressive stage is identified by the communities of *Prunus serotina*; (b) the mesophyllous series of Holocene terrace develops from the first nitrophyllous herbaceous stage belonging to *Arrhenatheretalia elatioris*, to a second forest-edge stage referable to shrubland communities (Sambucorobinieti) referable to *Carpinion betuli*, and to the final stage made up mesophyllous oak-hornbeam wood attributed to *Carpinion betuli*. The regressive stage belongs to communities referred to *Prunetalia spinosae*

The second case study regards the phytosociological definition of the mesophyllous and mesoigrophyllous oak-hornbeam forests set on late Pleistocene and Holocene alluvial sediments of the upper Po plain, in the Gera d'Adda (Bergamo). Thirty-one relevés were performed by using the phytosociological approach

(BRAUN – BLANQUET, 1932; WESTHOFF & VAN DER MAAREL, 1973). Two matrices were processed separately through a multivariate analysis approach (PCA) with the SYN-TAX 5.0 software (PODANI, 1994). The results indicate that clusters are distributed according to three main ecological gradients (defined by the LANDOLT index): soil moisture value (F); soil pH value (R); soil aeration value (D). The historical study, which was realized by comparing historical maps of different years (1833, 1889) with recent regional topographic maps (CTR, 1991), shows that Orfano Wood has relict characteristic. Orfano Wood is referred to two different associations: (a) *Querc-Ulmetum* Issler 1926 for the igrophyllous communities on Holocene sediments; (b) *Polygonato multiflori –Quercetum robori* subass. *carpinetosum betuli* Sartori 1980, which was included by ANDREIS e SARTORI (2002) in the *Alnion incanae* Pawlowski et Pawlowski et Wallisch 1928 (*Alno-Ulmion minoris* Br.-Bl. Et Tx.43), for the mesophyllous communities developed on Holocene sediments.

Concerning the other wood located on the Pleistocene “main level of the Po plain”, the mesophyllous woods belongs to *Erythronio-Carpinion* alliance (Hovart 1958) Marinček in Wallnöfer et al. 1993, with igrophyllous variant referable to *Ulmion minoris* Oberd.1953 suballiance.

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<b>INDICE</b>	<b>1</b>
<b>1. DINAMICA DI VEGETAZIONE</b>	<b>5</b>
Introduzione	6
1.1. Definizioni	8
1.2. La ricolonizzazione post-abbandono	13
1.2.1 Un modello di struttura della serie secondaria	14
1.3. Il sistema bosco	15
1.3.2 Modelli di espansione del bosco	16
1.4. Le forme biologiche nelle fasi di successione	19
1.5. Le forme corologiche nelle fasi di successione	20
1.6. Metodi di indagine del dinamismo della vegetazione	21
1.6.1 Studio diacronico o metodo del quadrato permanente	21
1.6.2 Studio sincronico	22
1.6.3 Studio storico	24
1.7. Lavori pregressi	25
1.6.1 La serie di vegetazione della Regione Lombardia	26
1.8. Scopi dello studio	27
1.9. <b>BIBLIOGRAFIA</b>	29
<b>2. DINAMICA DI VEGETAZIONE POST ABBANDONO: IL CASO DEL PARCO DEL RIO VALLONE (MI-LC, ITALIA)</b>	<b>37</b>
2.1. Introduzione	38
2.2. Area di studio	40
2.3. Materiali e Metodi	46
2.3.1 Variazioni della vegetazione naturale e dei coltivi a tre soglie storiche	49
2.3.2 Stima dell'età di abbandono	53
2.4. Risultati e Discussione	54
2.4.1 Descrizione delle tipologie vegetazionali indagate per la definizione delle serie	54
2.4.2 Ordinamento dei cluster per età	62
2.4.3 Le variabili ecologiche in funzione delle classi di età	65
2.4.4 Ordinamento dei cluster per gradienti ecologici	67
2.4.5 Un tentativo di sintesi: le serie di vegetazione	72
2.4.5.1. La serie di vegetazione dei terrazzi mindeliani	74
A. La serie nitro-acidofila	74
B. La serie mesoxerofila	77
2.4.5.2 La serie di vegetazione delle superfici terrazzate	80
2.5. Conclusioni	83
2.6. <b>BIBLIOGRAFIA</b>	86



<b>3. I BOSCHI RELITTI PADANI: IL CASO DELLA GERA D'ADDA (BG)</b>	<b>89</b>	
3.1	Introduzione	90
3.2	Area di studio	92
3.3	Cenni storici	94
3.4	Dati e Metodi	96
3.5	Risultati	97
	3.5.1 Ordinamento dei cluster per gradienti ecologici	97
	3.5.2 Sintassonomia	99
3.6	Discussione e conclusioni	100
	<b>I.</b> Robinio-carpineto con <i>Fraxinus ornus</i>	100
	<b>II.</b> Bosco Orfano - Querco-carpineto a <i>Ulmus minor</i> e <i>Allium ursinum</i>	103
	<b>III.</b> Schema sintassonomico	107
3.7	<b>BIBLIOGRAFIA</b>	<b>108</b>
4.	<b>BIBLIOGRAFIA GENERALE CONSULTATA</b>	<b>115</b>

#### **ALLEGATI**

#### **RINGRAZIAMENTI**

