I1.3 Arable land with unmixed crops grown by low-intensity agricultural methods

Summary

Species-rich arable weed vegetation, characterised by now rare native and archaeophyte annual plants, is a survivor of ancient low-intensity agriculture and widely distributed across Europe but survives in abundance only in the mountainous areas of the Mediterranean region, particularly Italy. Since the intensification of agricultural practices in the middle of the 20th century, much of it subsidised by agri-environment funding, a significant decrease both in quantity and quality has been observed caused by excessive use of herbicides, biocides, and chemical fertilizers, improved seed-cleaning methods, sowing highly productive and competitive varieties of cereals, and removal of refugial habitats in the landscape due to merging of small fields into large ones. Such threats continue in many places, especially threatening surviving outliers. A large scale improvement of quantity and quality may require a revision of Common Agricultural Policy and agri-environment funding schemes and promotion of restoration initiatives.

Synthesis

Despite variable data quality, a lack of data from several countries and different interpretations of the habitat definition, the decreases in quantity and quality have been calculated using the territorial data from a sufficient number of countries to build an overall European average. Due to a large decrease in area over the last 50 years, the habitat qualifies for category Endangered under criterion A1. All countries except Italy (-20% to -40%) and Switzerland (-37.5%) reported a decrease in area between -50% and -99%. If the Italian and Swiss data were neglected, the overall assessment would result in category Critically Endangered. It would also be worth improving the data on long historical trends in quantity because this habitat type would possibly qualify for category Critically Endangered under criterion A3.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Endangered	A1	Endangered	A1

Sub-habitat types that may require further examination

Various regional weed communities have been defined that could be differently threatened: in Central Europe arable land on dry soils, rich in carbonate and on saline soils; in the UK.: arable land on freely-draining acidic or sand-enriched soils in the coastal strip of southwest England and Wales, on thin soils over limestones in southern England, on clay soils in the midlands and south-west,on freely-draining sands in low-rainfall areas of eastern England

Habitat Type

Code and name

I1.3 Arable land with unmixed crops grown by low-intensity agricultural methods

Arable land with unmixed crops in Talmaciu, Romania (Photo: John Janssen).

Arable land with unmixed crops at the foothills of the Alps, Lower Austria (Photo: David Paternoster).

Habitat description

This habitat includes arable fields managed using low-intensity agricultural techniques with occurrence of rare native or archaeophyte weed species, survivors of a farming style that has existed in Europe since the Neolithic. The most common crops of such fields have been cereals including *Avena sativa, Hordeum vulgare, Triticum aestivum, T. turgidum* and *Secale cereale,* managed without herbicides, without application of non-organic fertilizers and often without irrigation systems. They were originally sown manually, which resulted in more patchy distribution of crop plants than when mechanical sowing is used, thus leaving space for the development of weeds and the crop seeds were often contaminated with weed seed.

Traditionally managed rain-fed fields have been preserved especially in the mountainous areas of the Mediterranean and although they are no longer profitable for corn production, they are still used locally for planting winter cereals as a source of fodder for livestock. Wheat is the most common crop but rotation with other cereals is common. Such fields are small in size, often located on terraces and are ploughed and sown in autumn and, when the crop biomass increases, they are either grazed or mown for hay. The fields are rich in low-competitive winter-annual weed species which reach their peak of biomass development in spring. Their species composition differs considerably from the irrigated Mediterranean fields, which are rich in weeds that germinate only in warmer periods in spring and reach their phenological optimum in summer or autumn. The latter also contain many more neophytes.

Outside the Mediterranean, the traditionally managed low-intensity fields are much rarer . They occur locally especially on soils with limited water-storage capacity such as on limestone slopes or on sandy plains but most arable fields in such unproductive environments have been abandoned during the last decades. Also here, cereals are the most common crop in such low-intensity farming systems as survive. Wherever low site fertility does not allow the development of dense stands of the crop and the use of herbicides is limited, species-rich weed communities including several archaeophytes of the Mediterranean and Near East origin may develop. Some of these weed species were relatively common until the first half of the 20th century, but they declined dramatically due to agricultural intensification including the use of herbicides, chemical fertilizers, improved seed-cleaning methods, sowing highly productive and competitive varieties of cereals, and removal of refugial habitats in the landscape due to merging of small fields into large ones. Nowadays in many cases, species-rich weed communities only occur in narrow stripes along field margins that are not treated with herbicides or in restoration initiatives.

Indicators of good quality:

·   Occurrence of rare or declining, native or archaeophytic weed species

·   Low incidence of neophytic weeds

·   No use of mineral fertilizers

- No or limited use of herbicides

- No irrigation in dryland areas

Characteristic species:

Vascular plants: *Adonis aestivalis, A. flammea, Agrostemma githago, Ajuga chamaepitys, Allium nigrum, Alopecurus myosuroides, Anagallis arvensis, Anthemis altissima, Aphanes arvensis, A. australis, Arnoseris minima, Asperula arvensis, Bifora radians, B. testiculata, Bupleurum rotundifolium, Caucalis platycarpos, Centaurea cyanus, Chrysanthemum segetum, Conringia orientalis, Euphorbia exigua, Galium tricornutum, G. verrucosum, Gladiolus italicus, Hypecoum procumbens, Hypochaeris glabra, Legousia speculum-veneris, Lilium bulbiferum, Lithospermum arvense, Lolium rigidum, L. temulentum, Medicago polymorpha, Muscari comosum, Nigella arvensis, Papaver argemone, P. hybridum, P. rhoeas, Ranunculus arvensis, Raphanus raphanistrum, Reseda phyteuma, Rhagadiolus stellatus, Roemeria hybrida, Scandix pecten-veneris, Silene gallica, Stachys annua, Teesdalia nudicaulis, Thymelaea passerina, Turgenia latifolia, Veronica agrestis, V. triloba, Vicia sativa*

Classification
This habitat may be equivalent to, or broader than, or narrower than the habitats or ecosystems in the following typologies.

EUNIS:

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EuroVegChecklist:

Lolio remoti-Linion J.Tx. 1966

Spergulo arvensis-Erodion cicutariae J.Tx. in Passarge 1964

Scleranthion annui (Kruseman et Vlieger 1939) Sissingh in Westhoff et al. 1946

Oxalidion europeae Passarge 1978

Rumicion bucephalophori Nezadal 1989

Anthemido ruthenicae-Sisymbrion orientalis Solomakha 1990

Caucalidion von Rochow 1951

Veronico agrestis-Euphorbion pepli Sissingh ex Passarge 1964

Trifolio-Medicaginion sativae Balázs 1944

Ridolfion segeti Nègre ex Rivas-Mart., Fernández-González et Loidi 1999

Roemerion hybridae Rivas-Mart.,Fernández-González et Loidi 1999

Vicio narbonensis-Milion vernalis Ferro et Scammacca 1985

Fumarion wirtgenii-agrariae S. Brullo in S. Brullo et Marcenó 1985

Eragrostion cilianensis-minoris Tx. ex Oberd. 1954

Cerintho majoris-Fedion cornucopiae Rivas-Mart. et Izco ex Peinado et al. 1986

Annex 1:

No relationship

Emerald:

No relationship

MAES-2:

Sparsely vegetated land

 IUCN:

14.1. Arable Land

Does the habitat type present an outstanding example of typical characteristics of one or more biogeographic regions?
No

Justification
The habitat type occurs in almost all EU28+countries except Iceland and probably Norway and Cyprus but has been best preserved in the mountainous areas of the Mediterranean region.

Geographic occurrence and trends

EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Austria	Present	135 Km^2	Decreasing	Decreasing
Belgium	Present	Unknown Km^2	Decreasing	Decreasing
Bulgaria	Present	Unknown Km^2	Decreasing	Decreasing
Croatia	Present	10 Km^2	Decreasing	Decreasing
Cyprus	Present	Unknown Km^2	Unknown	Unknown
Czech Republic	Present	3000 Km^2	Decreasing	Decreasing
Denmark	Present	Unknown Km^2	Unknown	Unknown
Estonia	Present	655 Km^2	Unknown	Unknown
Finland	Finland mainland: Present	Km^2	Decreasing	Unknown
France	France mainland: Present	2250 Km^2	Decreasing	Decreasing
Germany	Present	Unknown Km^2	Decreasing	Decreasing
Greece	Greece (mainland and other islands): Present	Unknown Km^2	Unknown	Unknown
Hungary	Present	35 Km^2	Decreasing	Decreasing
Ireland	Present	1 Km^2	Decreasing	Decreasing
Italy	Italy mainland: Present Sardinia: Present Sicily: Present	20538 Km^2	Decreasing	Decreasing
Latvia	Uncertain	Km^2	-	-
Lithuania	Present	10 Km^2	Decreasing	Decreasing
Luxembourg	Uncertain	Km^2	-	-
Malta	Uncertain	Km^2	-	-
Netherlands	Present	12.5 Km^2	Decreasing	Decreasing
Poland	Present	15.6 Km^2	Unknown	Decreasing
Portugal	Portugal mainland: Present	754 Km^2	Decreasing	Unknown
Romania	Present	8 Km^2	Increasing	Unknown

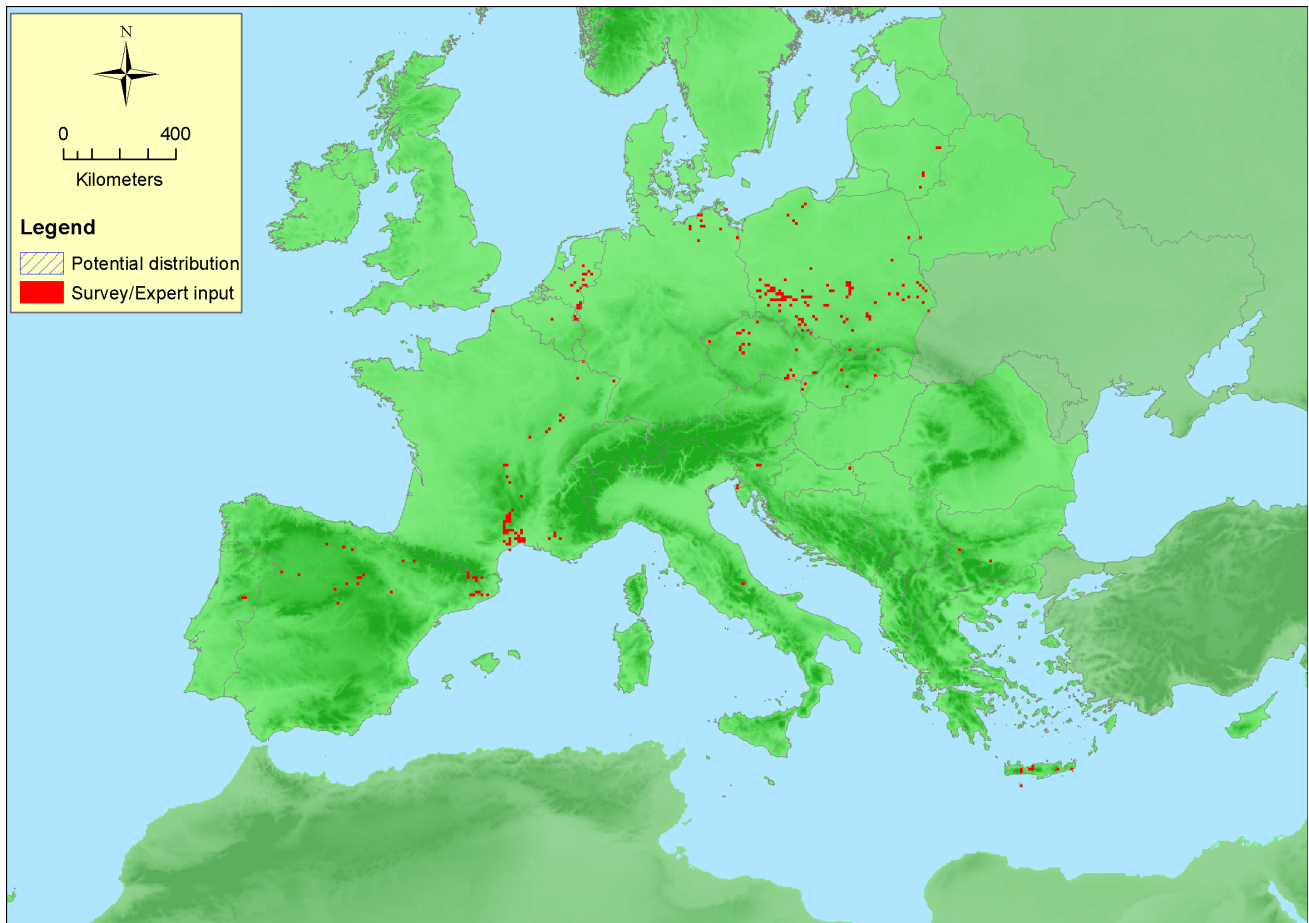| EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Slovakia	Present	200 Km^2	Decreasing	Unknown
Slovenia	Present	5 Km^2	Decreasing	Decreasing
Spain	Spain mainland: Present	Unknown Km^2	Decreasing	Decreasing
Sweden	Uncertain	Km^2	-	-
UK	United Kingdom: Present	188 Km^2	Decreasing	Unknown

EU 28 +	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Albania	Uncertain	Km^2	-	-
Bosnia and Herzegovina	Present	5 Km^2	Decreasing	Decreasing
Former Yugoslavian Republic of Macedonia (FYROM)	Present	Unknown Km^2	Decreasing	Unknown
Kaliningrad	Uncertain	Km^2	-	-
Kosovo	Uncertain	Km^2	-	-
Montenegro	Uncertain	Km^2	-	-
Serbia	Uncertain	Km^2	-	-
Switzerland	Present	500 Km^2	Decreasing	Decreasing

Extent of Occurrence, Area of Occupancy and habitat area

	Extent of Occurrence (EOO)	Area of Occupancy (AOO)	Current estimated Total Area	Comment
EU 28	3928700 Km^2	256	27817 Km^2	no data from Greece, Cyprus, Latvia, Luxembourg, Malta, Sweden
EU 28+	3928700 Km^2	257	28322 Km^2	no data from Greece, Cyprus, Latvia, Luxembourg, Malta, Sweden, Norway, Albania, Kosovo, Montenegro, Kaliningrad, Serbia

Distribution map

The provided map has many gaps and reflects the availability of EVA data. Missing countries: Denmark, Estonia, Ireland, Macedonia, Albania, Kosovo, Bosnia-Herzegovina, Montenegro, Serbia, Romania, Greece, Latvia, Malta, Russia (Kaliningrad), Sweden, Austria, Hungary, Switzerland, United Kingdom, and too few occurrences in: Bulgaria, Germany, Spain, Croatia, Czech Republic, France, Italy, Portugal. Data source: EVA.

How much of the current distribution of the habitat type lies within the EU 28?

About 60%

Trends in quantity

The quantification of long historical trends is difficult, but it is assumed that almost all arable land around 1850 was extensively managed and of relatively high ecological interest. Since the intensification of agricultural practices in the middle of the 20th century, a significant decrease of traditionally managed agricultural area has occurred. The calculated overall trend for the last approximately 50 years both for EU28 and EU28+ countries is a decrease of 70% (EU28: 70.5%; EU28+ 70.2%). Most of the countries, except Italy (-20% to -40%) and Switzerland (-37.5%), have reported moderate to severe decreases (-50 to -99%) in quantity. As far as the trend at the moment is concerned, the vast majority of both EU28 and EU28+ countries have reported on an ongoing decrease, which is expected to continue in the future.

- Average current trend in quantity (extent)
  EU 28: Decreasing
  EU 28+: Decreasing
- Does the habitat type have a small natural range following regression?
  No
  Justification
  Though the habitat has undergone an important decline during the last 50 years, the habitat is still

widely distributed across Europe. The EOO is larger than 50000 km².

- <u>Does the habitat have a small natural range by reason of its intrinsically restricted area?</u>
  No
  Justification
  The geographical range (EOO) of the habitat type is very wide and the underlying factors for its occurence are not restricted to small areas.

Trends in quality

There is very little arable land left in Europe that has not been affected by the agricultural intensification that has occurred particularly since the middle of the 20th century. According to the calculated trends, an intermediate decline in quality has occurred over the last 50 years, affecting more than 50% of the total area (EU28: 50.2%; EU28+: 51.0%) with a severity of degradation of 67%. The decline in quality is expected to continue in the future due to ongoing intensification of agricultural practices. Seed banks have been destroyed to a large extent and some characteristic archaeophytic species have become very rare and are threatened with extinction in some areas. The potential for recovery of these habitats is subject to much uncertainty.

- <u>Average current trend in quality</u>
  EU 28: Decreasing
  EU 28+: Decreasing

Pressures and threats

The major threats are related to agricultural intensification. The use of herbicide, insecticide and other agrochemicals, the large-scale removal of field boundaries, mechanisation, adoption of highly-yielding crop varieties and heavy fertiliser use, have resulted in massive losses of farmland birds and plants and less well-understood declines of other typical organisms of this habitat. Much of this shift in management has been encouraged and subsidised by the Common Agricultural Policy and other national agri-environment funding. The remaining sites of biodiverse, non-intensively-farmed, less profitable arable land are threatened by abandonment and conversion to other land-uses (e. g. improved grassland, urbanised areas, solar arrays).

List of pressures and threats

Agriculture

Modification of cultivation practices
    Agricultural intensification
Annual and perennial non-timber crops
    Abandonment of crop production
Use of biocides, hormones and chemicals
Fertilisation

Conservation and management

A large-scale improvement regarding quantity and quality of this habitat type may require a revision of Common Agricultural Policy (CAP) and agri-environment funding schemes. Additionally, exemplary sites of this habitat type can be preserved as open-air museums in protected areas.

List of conservation and management needs

Measures related to agriculture and open habitats

Other agriculture-related measures

Measures related to spatial planning

Establish protected areas/sites

Legal protection of habitats and species

Manage landscape features

Conservation status

Annex 1 types:

No related Annex 1 types available.

When severely damaged, does the habitat retain the capacity to recover its typical character and functionality?

There is much uncertainty about population dynamics and recovery potential of rare native and archaeophytic weed communities. It is assumed that the seed banks have been destroyed to a large extent. If a characteristic seed bank is still available, the regeneration may happen comparatively quick, but requires waiving of herbicide, biocide and excessive use of chemical fertilizers. If the characteristic seed bank has already been destroyed, the recovery will take a longer time unless restoration involves the addition of seed from elsewhere. The capacity to recover also depends on the degree of fragmentation.

Effort required

10 years	20 years	50+ years
Through intervention	Through intervention	Through intervention

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	-71 %	unknown %	unknown %	unknown %
EU 28+	-70 %	unknown %	unknown %	unknown %

The figures for A1 were calculated by using the territorial data sheets. The calculated trend in the last 50 years is a decrease of 70.5% (EU28) and 70.2% (EU28+), which leads to category Endangered. All other countries except Italy (-20% to -40%) and Switzerland (-37.5%) reported a decrease in area between -50% and -99%. If the the Italian and Swiss data were neglected, the overall assessment would result in the category Critically Endangered. The calculated long historical trend (A3) is a reduction of 95%, that would result in category Critically Endangered but due to a lack of data from important countries (e. g. Germany, Poland, Italy, Bulgaria, Czech Republic, Spain) the calculated long historical trend is not absolutely reliable. Therefore, criterion A3 is evaluated as Data Deficient. No data (%) available or unsufficient data for A2a, A2b.

Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	> 50000 Km^2	Unknown	Unknown	unknown	> 50	Unknown	Unknown	unknown	unknown
EU 28+	> 50000 Km^2	Unknown	Unknown	unknown	> 50	Unknown	Unknown	unknown	unknown

No data have been provided for EOO and AOO until now.

Criterion C and D: Reduction in abiotic and/or biotic quality

Criteria C/D	C/D1		C/D2		C/D3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	50 %	67 %	unknown %	unknown %	unknown %	unknown %
EU 28+	51 %	67 %	unknown %	unknown %	unknown %	unknown %

Criterion C	C1		C2		C3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	unknown %	unknown %	unknown %	unknown %	unknown %	unknown %
EU 28+	unknown %	unknown %	unknown %	unknown %	unknown %	unknown %

Criterion D	D1		D2		D3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	unknown %	unknown%	unknown %	unknown%	unknown %	unknown%
EU 28+	unknown %	unknown%	unknown %	unknown%	unknown %	unknown%

The values for C/D1 were calculated by using the territorial data sheets. The calculated figures result in category Vulnerable. No reliable data (%) available for C/D2, C/D3, C1, C2, C3, D1, D2 and D3.

Criterion E: Quantitative analysis to evaluate risk of habitat collapse

Criterion E	Probability of collapse
EU 28	unknown
EU 28+	unknown

There is no quantitative analysis available that estimates the probability of collapse of this habitat type.

Overall assessment "Balance sheet" for EU 28 and EU 28+

	A1	A2a	A2b	A3	B1	B2	B3	C/D1	C/D2	C/D3	C1	C2	C3	D1	D2	D3	E
EU28	EN	DD	DD	DD	LC	LC	LC	VU	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	EN	DD	DD	DD	LC	DD	LC	VU	DD	DD	DD	DD	DD	DD	DD	DD	DD

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Endangered	A1	Endangered	A1

Confidence in the assessment
Medium (evenly split between quantitative data/literature and uncertain data sources and assured expert knowledge)

Assessors
D. Paternoster

Contributors

Habitat definition: M. Chytrý

Territorial data: E. Agrillo, S. Armiraglio, S. Assini, F. Attorre, S. Bagella, C. Bita-Nicolae, G. Buffa, J.Capelo, A. Čarni, L. Casella, M. Chytrý, R. Delarze, L. M. Delescaille, S. De Saeger, D. Espírito-Santo, P. Finck, C. Giancola, D. Gigante, J. Janssen, N. Juvan, Z. Kącki, T. Kontula, J. Loidi, C. Marcenò, V. Matevski, D. Milanović, Z. Molnár, F. O'Neill, G. Pezzi, V. Rašomavičius, U. Raths, U. Riecken, E. Roosaluste, V. Rusakova, S. Sciandrello, A. Ssymank, W. Van Landuyt, D. Viciani, E. Weeda, P. Wilson, Z. Škvorc

Working Group Sparsely Vegetated Habitats: F. Essl, G. Giusso Del Galdo, A. Mikolajczak, D. Paternoster, M. Valachovič, M. Valderrabano

Reviewers

J. Rodwell

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