E1.F Azorean open dry, acid to neutral grassland

Summary

This habitat of ungrazed grasslands, with mixtures of grasses, herbs and mat-formers, including and dominated by many endemics, is confined to the Azores where it is characteristic of rocky slopes, ledges and landslips with nutrient-poor acid soils. The species composition varies according to the altitude and climate, rock type and stability of the terrain. Introduction of cattle and a recent increase in dairying threatens the habitat by reducing its extent and stimulating invasion of aliens and protection is needed for the small scattered localities.

Synthesis

A large extent of reduction in the last 50 years was estimated (-53%), yielding criterion A1 applying to the Endangered (EN) status. This decline was a result of large expansion of nitrogen-driven intensive swards grazed by cattle. Historical reduction (criterion A3) was estimated to be at least 50%, resulting in a Vulnerable (VU) status. The same category (VU) results from a restricted distribution (EOO=39000 km^2, AOO=23 grid cells) in combination with a continuing decline. Conservation actions were taken and trends are estimated to stabilise in the future.

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

The sub-habitats referred to in the description would be worth to consider in the future.

Habitat Type

Code and name

E1.F Azorean open dry, acid to neutral grassland

Grassland dominated by *Festuca francoi* on the slope of Pico Mountain, Pico Island, Azores (Photo: Jorge Capelo).

Azorean grassland with *Leontodon filii*, a characteristic plant of the habitat subtype in altitudes above 300 m above sea level (Photo: Jorge Capelo).

Habitat description

Non-grazed perennial grasslands of rocky outcrops and slopes dominated by strictly Azorean endemic grasses, hemicryptophytes and dwarf chamaephytic forbs. The majority of the non-woody vascular Azorean endemics are found in this habitat. The habitat can be divided in subtypes that are different in substrate, geomorphology and bioclimate, and thus in species composition, vegetation structure and dominance. It spans from the thermomediterranean (Santa Maria and SW of São Miguel Islands only) and thermotemperate to the supratemperate belts of the Azorean biogeographical Province. Two main subtypes can be distinguished:

Subtype #1. Open grasslands with scattered megaphorbs dominated or co-dominated by combinations of *Deschampsia foliosa, Festuca francoi* (=*F. jubata*)*, Holcus rigidus, Agrostis azorica, Leontodon rigens* and *Leontodon filii*. They grow in meso-supratemperate climate (i.e. in altitudes above 300 m.), in nutrient-poor, acid soils, either in steep earthy or rocky slopes subject to gravitational disturbance, slope deposits with peat formation or under the permanent influence of gusting winds. Pioneer versions can be found colonizing former biotopes, like blanket bogs that were removed by catastrophic mass movements. The subtype contacts with vegetation of Azorean *Juniperus* woodland (G3.9c) and Azorean heath (F4.3).

Subtype #2. Low-altitude (thermomediterranean and thermotemperate) open grasslands of cliffs and landslide scarps, either in rock outcrops or earthy platforms between rocks, dominated by combinations of *Agrostis congestiflora* subsp*. congestiflora, Festuca petraea, Holcus rigidus* and *Brachypodium gaditanum*. The main contacts are woody vegetation of *Picconia azorica* and/or *Pittosporum undulatum* (alliance *Myrico fayae-Pittosporion*, habitat G2.3) and Azorean heath (F4.3).

The enormous extent of zooanthropic swards of introduced grasses in the Azores, used for dairy production, is a severe threat to the endemic grasslands. Soil tilling followed by cattle grazing causes immediate destruction of the endemic habitat type and its permanent substitution by alien-dominated swards. Also, even if endemic grasslands are preserved well in sites far from artificial swards, alien flora tends to invade them by seed dispersal, leading to invasion of endemic grassland by alien grasses with similar ecological requirements and genetic contamination of Azorean endemics by taxonomically close relatives (i.e. aliens of the same genus). The main alien grasses of artificial swards are *Anthoxantum odoratum*, *Holcus lanatus*, *Dactylis glomerata* and *Agrostis castellana*. Some other frequent aliens are *Lotus pedunculatus, Rumex conglomeratuss, Crepis lampsanoides* and *Hypochaeris glabra*. Ecological integrity of Azorean endemic grasslands is beste maintained by exclusion of man-induced disturbances and keeping distance to zooanthropogenic swards.

Indicators of good quality:

- absence of alien plant species
- no human disturbances

Characteristic species:

Flora, Vascular plants:

Common to both subtypes: *Agrostis azorica* (dom.)*, Brachypodium gaditanum* (dom.)*, Carex guthnickiana, Carex vulcani, Centaurium scilloides, Holcus rigidus* (dom.), *Luzula purpureo-splendens, Lysimachia azorica, Scabiosa nitens and Tolpis azorica*.

Characteristic of subtype #1: *Deschampsia foliosa* (dom.), *Festuca francoi* (=*F. jubata* sensu auct. az. non Lowe) (dom.), *Leontodon rigens*, *Holcus rigidus* (dom.), *Leontodon filii*, *Agrostis botelhoi*, *Agrostis congestiflora* subsp. *oreophylla*, *Carex punctata*, *Euphrasia azorica*, *Euphrasia grandiflora*, *Myosotis azorica* and *Veronica dabneyi*.

Characteristic of subtype #2: *Agrostis congestiflora* subsp. *congestiflora* (dom.), *Agrostis gracililaxa*, *Carex*

hochstetterana, *Daucus carota* subsp. *azoricus*, *Euphorbia azorica*, *Festuca petraea* (dom.) and *Tolpis succulenta*.

Classification

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

EUNIS:

- (No clear correspondence to any of the types of EUNIS classification level 3)

EuroVegChecklist:

Festucion francoi

Tolpido succulentae-Agrostion congestiflorae

Annex 1:

6180 Macaronesian mesophile grasslands

Emerald:

E2.15 Macaronesian mesic grassland

MAES-2:

Grassland

IUCN:

Temperate grassland

Does the habitat type present an outstanding example of typical characteristics of one or more biogeographic regions?

Yes

Regions
Macaronesian

Justification
This habitat type is restricted to the Azores archipelago, being dominated and characterized by strictly Azorean endemic species.

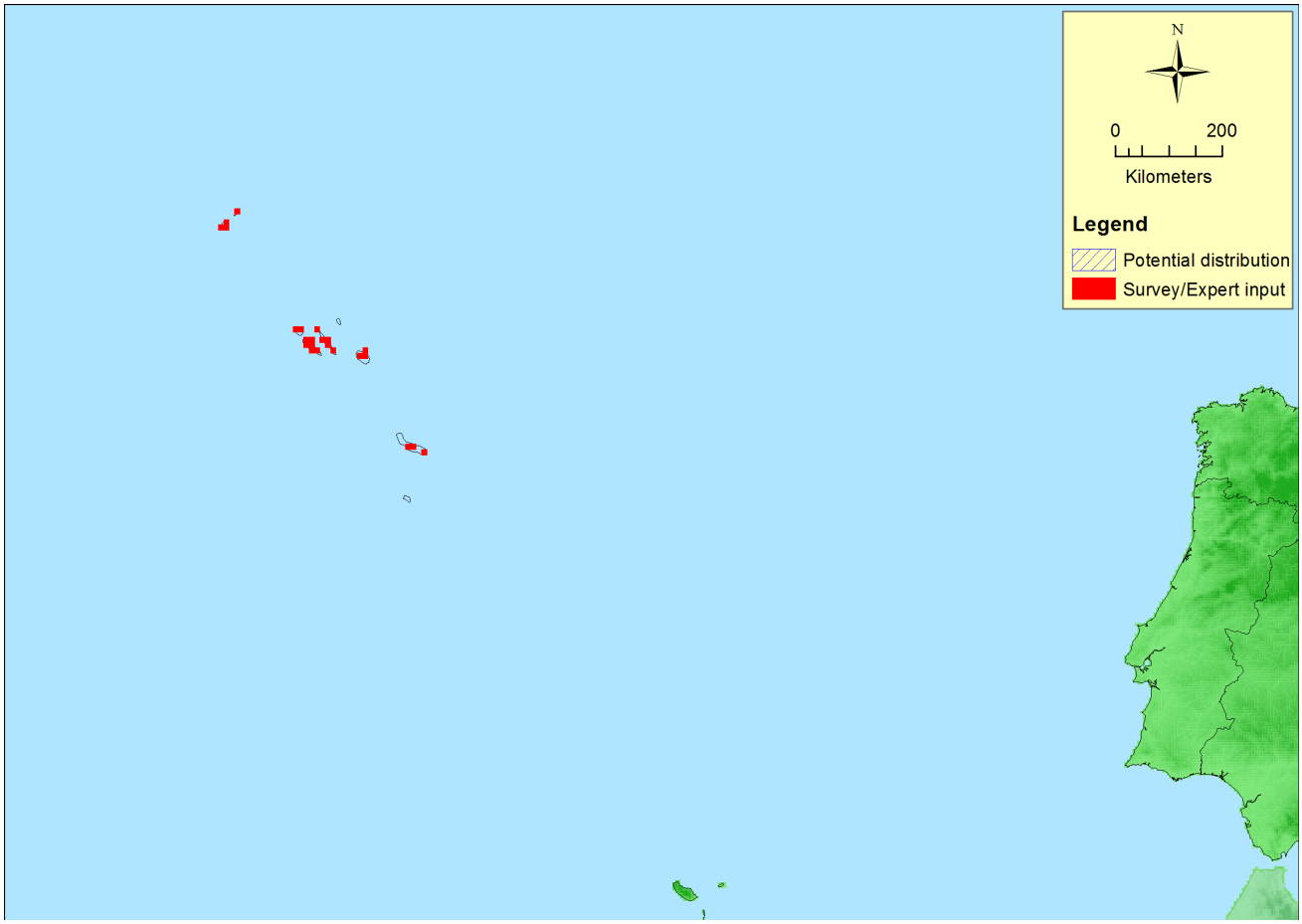
Geographic occurrence and trends

EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Portugal	Portugal Azores: Present	8 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	39000 Km^2	23	8 Km^2	
EU 28+	39000 Km^2	23	8 Km^2	

Distribution map



The map is likely to be complete. Data sources: Art17.

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

100% of the habitat area lies whithin the EU28.

Trends in quantity

Although no accurate data on historical reduction are available it is estimated that a severe reduction (more than 50%) has taken place since the colonization of settlers in the 15th century. The reduction was caused because of the intensification of grazing which led to the replacement of endemic flora by the introduced continental flora. In the last 50 years a high reduction has also taken place due to macroeconomic settings and policies that favored the enormous increase of dairy products and cow husbandry. These policies led to the increase of the area of intensive swards with very heavy nitrogen mineral fertilization which are composed of semi-nitrophyllous species (e.g. *Hocus lanatus, Mentha suaveolens*) and some alien grasses (e.g. *Sporobolus africanus, Dactylis glomerata*). The extent of reduction in quantity from 1974 is estimated at - 53 % on the basis of agricultural statistics. Present habitat's area is expected not to be reduced because of the conservation measures that have been implemented.

- Average current trend in quantity (extent)
  EU 28: Decreasing
  EU 28+: Decreasing
- Does the habitat type have a small natural range following regression?
  Yes
  Justification
  The range of the habitat (EOO) is smaller than 50.000 Km^2 (the threshold for criterion B1) and the area

has highly been reduced (-53%) during the last 50 years. Nowadays, the reduction has probably a small rate due to the conservation policies implemented in the Azores.

- Does the habitat have a small natural range by reason of its intrinsically restricted area?
  Yes
  Justification
  The range is small as the habitat is geographically restricted to the archipelago of the Azores.

Trends in quality

No quantitative data are available on the quality of habitat. However, it is estimated that a reduction higher than 30% has been taken place because of the deterioration of the composition and structure of the original meadows that has been altered by the invasion of alien species. Decrease in quality is estimated to have continued during the last 50 years. Current and future trends in quality may be considered as stable because of the conservation measures that have been implemented from the one hand, and the lack of the ability of endemic species to over-compete the alien species and thus to regain their distribution in areas where have been replaced, on the other hand.

- Average current trend in quality
  EU 28: Decreasing
  EU 28+: Decreasing

Pressures and threats

The most serious threats are replacement by alien continental flora and land-use convertion of natural meadows to intensive nitrogen-driven swards with cattle. Even if replacement ceases, alien flora has competitive habitity to overcome azorean endemics. Even natural disturbance, like gravitational disturbance (landslide and solifluction) might favour alien grasses (*e.g. Sporobolus africanus, Agrostis castellana*).

List of pressures and threats

Agriculture

Intensive grazing
Intensive cattle grazing
Fertilisation

Invasive, other problematic species and genes

Invasive non-native species

Geological events, natural catastrophes

Collapse of terrain, landslide

Conservation and management

Most important management approaches are:

- Conservation of meadow habitats that will be designated as reserves, with strict protection.
- Restoring of marginal, less intensive swards, which still host endemic species by ceasing cattle grazing and fertilization.
- Implementation of a monitoring scheme.

List of conservation and management needs

No measures

Measures needed, but not implemented

Measures related to agriculture and open habitats

Maintaining grasslands and other open habitats

Measures related to spatial planning

Establish protected areas/sites

Conservation status

Annex 1:

6180: MAC U1

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

Ceasing of grazing and fertilization in marginal areas that still host endemic species may help the gradual restoration of the habitat. The time period needed for the full restoration of characteristic species composition and structure is estimated to be long.

Effort required

50+ years
Naturally and through intervention

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	-53 %	stable %	stable %	>-50 %
EU 28+	-53 %	stable %	stable %	>-50 %

Reduction in quantity is estimated on the basis of agricultural statistics since 1974 and the evidence of changes in cultural practices from semi-extensive cattle grazing to heavy nitrogen-driven swards. Future trends are considered as stable because of the conservation policies that have been already implemented.

Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	39000 Km^2	Yes	No		23	Yes	No		
EU 28+	39000 Km^2	Yes	No		23	Yes	No		

The EOO and AOO are both below the thresholds for criterion B1 and B2, respectively. Slight further decreases in quality and quantity may be expected due to the everywhere presence of alien species in the region of the habitat. As far as conservation measures start to be implemented the actual and future trends are expected to become stable. The combination of small geographical distribution (both for EOO and AOO) and continuing negative trends, lead to the category Vulnerable (VU) for both B1 and B2. The number of locations is unknown.

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	unknown %	unknown %	unknown %	unknown %	unknown %	unknown %
EU 28+	unknown %	unknown %	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%

Altgough a proportion of marginal (less intensive) grazing land where endemic species could have coexisted with aliens, a value for the extent is not possible to evaluate.

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	LC	LC	VU	VU	VU	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	-
EU28+	EN	LC	LC	VU	VU	VU	DD	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

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