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APPENDIX
Strategies to prepare the European Grassland Map.
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INAPG

A P P E N D I X

Strategies to prepare the European Grassland Map.

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INTRODUCTION.

The General European Map 1:1.000.000, will be made quickly, -one or two years-, profiting similar Maps, (mainly the phytoclimatic ones) and new techniques on RS interpretation.

It will be essential to use our Project in several Pilot places, and mainly to train botanists and ecologists from many countries and Research Institutions, to interpret from many places the Grassland types. In our mind (F.FILLAT and P.MONTSERRAT), during this period will be necessary to consolidate a good cartographic work and many research teams to prepare a normal evolution of our research; this feed-back will be essential in our Cartographic work on Grass-Production, mainly based in a fine field research.

In Spanish language, MONTSERRAT explain also here this situation mainly in North Spain, with many climatic situations similar to the European ones; but in South Spain, the very dry Summer and hot soils from April-May, are the more limitant factors to turf-grassland production. Lignine increase in this conditions, and make a plant production adapted to goats, donkeys or camels, but not appropriate to normal grazing. The European scale will be very good to explain the main distinction of different strategies, in N. and S. Europe.

There are similar maps (the FAO one), also many Vegetation Maps, and now only will be necessary to increase the grasslands, by striped bands, together with many adapted simbols, profiting also several RS recent Maps.

This first step (1:1.000.000 scale) will be made in 4 situations, the more evident in Europe: Four special maps, ending lastly in the more general European Map, but more easy to prepare by specialists trained in his own country and under their own ecological situation.

After, by a coordinate work and quickly, will be possible to "interpret" special situations for to make a general european map.

The Taiga and North situations of the Finland and Scandinavian countries, will recomend to us a Map till the central part of Europe. Another one in West countries and also central european situations. The Mediterranean sector will be divided: the West (Madeira-Portugal, Spain, Rif-Argel in N.Africa, S.France-Italy) and the East sector (Balkans-Grece, Crete, Anatolie and Caucas). That strategie will be essential, and full of many promiser and coordinate possibilities.

Division of this General Map 1:1.000.000 in 4 sectors (published quickly), will be more useful and easy to complet in few years. Information collected from many situations, will improve also the use of a more specialised mapping by RS (an essential step in our work).

The main Criterion will be to evaluate grass production for every country or map sector; and this will be quantified mainly by how many grazing animals are found in normal fields, steppes, or mountain grasslands. Productivity is the increase of Plant or Animal Biomass by every surface unity, and that one will be the main clasificatory step . The more scientific, Ecophysiological studies , will be useful after, in a more special stages of our knowledge, mainly to make another Map with a programed ecological scientific research.

Research aspects on grass production.

The Mapping Project at the European scale, will encourage research on the albedo studies, related to the photosynthesis efficiency and consequently to the light differential absortion. In our meaning, the opportunity of this type of research is increasing now. Many types of physiologists, together with teams of field ecologists, will be esential, and in some countries, the beginning of this research will be encouraged.

Grass production is dependent mainly on photosynthetic pigments. In marine conditions, Margalef arrived to one Pigment Index (D430/ D666) very useful to know the plancton productivity in water. It will be possible to found also a similar simplification in Terrestrial Ecology, but the topographic and historical grassland conditions are making here a more complex situation, MARGALEF (1975), comment similarity and also many disparities in aquatic's compared to terrestrial systems. However, in every seral stage, or plant community evolution from grazed fields or pastures in mountains, will be possible to found simplifications studing modified albedos, the reflected light from grasslands.

In Mediterranean conditions with a very dry and hot Summer, soil temperature increase together with plant respiration, mainly near

the hot soil; no green production and plenty of lignified structures are found in summer. It will be possible to make also an index or a many simple lieth weave relations, to interpret stational changes in plant physiologie and production. Studies on several Pilot plots, will increase our research efectivity and multiply connections with our modern RS studies.

Special management Maps

In some situations, mainly where ecologists and pasture agronomists are working together, -like in West Spain (Salamanca), with José Manuel GOMEZ & Balbino GARCIA (in BALCELLS,1977-1982)-, will be possible a fruitful research. Also in the National Park of Ordesa-Monte Perdido and neighbouring valleys, -mainly on the good meadows of Fragen (FILLAT et al.,1991-1992)-, will be possible to improve our RS research on grass production. In our Instituto Pirenaico de Ecología (CSIC) we study now the meadows and pastures productivity in the Aisa valley and also at Fragen; some years ago our botanists was studying also the Gistain & Plan valley (MONTERRAT et al.,1984) and now it will be possible to prepare a coordinate research Project with foreign specialists, -from other European countries-, to explore the RS possibilities in this valley and also in many places of our Central Spanish Pyrenees. It is essential to profit our experience in many Pyrenean grasslands.

The grassland productivity always is changing, influenced by topography and time; now will be esential to prepare some research places or Pilot plots conducted by computer, to interpret so many variations in albedos. The changing situations studied in many experimental places, will improve the feed-back, and also our research teams.

The shepherd's gestion on mountains and also in many extensive Grasslands by RS , -after many ecophysiological studies in experimental places- , will prepare the research man, and training also some research teams, to improve the scientific gestion in our "pastos comunales" (MONTERRAT,1983), the common grazing lands in Spain. If good research is made, -with many connections in all Spain and Europe-, a nice Progress will be possible, improved in exponential scale by the feed-back.

The Spanish or Peninsular organization.

It will be easy to prepare research work and to have technical aids in N. Spain, but the ecophysiological work will be important in the

warmer sector, because strategies to avoid plant respiration are more common and diversified. The drying in summer of *Andropogoneae* and quick recovering after the first rain in september, is very common in the driest grasslands of E-SE Spain. The C4 strategie is very common in eutrophised valleys of Ebro Bassin and the SE Spain (*Salsole-Peganion*). The CAM strategie is very local, allways in small surfaces on the warmer rocs. Studies on RS will improve our knowledge in this field.

Ecological research will be directed to this type of studies and will be profited after some years, but with a very good information suitable to make grassland maps. Now we are interested to profit information from the past Research Projects and the RS recent technologie. The N.Spain is similar to european conditions and here will be easy to prepare maps in few years of a team work. There are immediate, real possibilities in:

A - Technical aspects. Mainly to interpret RS information, and to prepare AUTHOMATIC MAPS from this procedence. One Institut,

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scientific, botanical-ecological research: University.Barcelona.

Institut Botànic, "

B - Productivity in the Grassland Plots, with the
space and time situation. -- Limitant Factors
studied in many mountains and marginal lands.

This type of research will be situated, in

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Navarra, <u>Urbasa</u> .	Gobierno de Navarra (Depart.Med.Amb.).
	Universidad de Navarra (Ecofisiología).
<u>W.Spain</u> , <u>Dehesas</u> .	Depart. Ecología. Salamanca University.
	" " University of León.
	" " University of Badajoz.
	CSIC in Salamanca. The I.O.A.T.O.

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