

## *Geographic Analysis of the Afur Juniper Woodland (Tenerife, Canary Islands)*

### I. INTRODUCTION

Thermophilous woodlands are unveiled as the plant formation conveying the highest level of identification difficulty within the altitudinal belts model in which the vegetation of the Canary Islands is organised. The aforementioned difficulty results from two main reasons: the spatial discontinuity of its current forms and its diversity. Its territorial fragmentation could be explained as an effect of the intensity of the anthropic influence, since its presence coincides with the enclaves chosen as sites for the most traditional population settlements and their cultivation areas. Its diversity, in turn, is determined by the particular environmental ecotonic conditions given in those places. This is a xero-thermic climatic frame that permits that the range of environmental tolerance of thermophilous species is combined with those of plants belonging to the adjacent formations (evergreen laurel forest and *Euphorbia* scrubs). All those circumstances have contributed that this altitudinal vegetation belt presently appears as the most degraded and reduced in the Canarian archipelago.

### II. OBJECTIVES, SOURCES AND METHODS

Among the diverse remaining manifestations of thermophilous forests in the Canaries, those composed by juniper woodlands need to be regarded as the most representative in terms of their spatial relevance. Its present-day surface covers more than 60% of the total surface

occupied by thermophilous woodlands, which means that they are in the best conditions of preservation and in the highest rates of ecological relevance. In Tenerife, more precisely, they extend along 290 ha and their largest manifestations are located in the Anaga Massif, on the north-eastern side of the island. They are there circumscribed to two particular spots: Afur and Mesa del Sabinar or Punta de Anaga. In terms of its extension, 64 ha, and diversity, the former appears as the best preserved sample of insular thermophilous vegetation.

The aim of this paper has been a geographical analysis of the Afur juniper woodland, in an attempt at delimiting its spatial scope and singling out its main internal units. The characterization of phytogeographical units has been intended on the blending of physiognomic, floristic and dynamic criteria, and the influence of the different environmental factors has been considered for their explanation. Thus, phytogeographical units have been interpreted from a plural, integrated perspective assimilating them to units of the plant landscape.

The scattered and impoverished samples of thermophilous vegetation, in general, and juniper woodlands, in particular, postponed to relatively late dates their scientific study, and, thus, the first geographical analysis of the Anaga juniper forests was accomplished in the early years of the 1980s. In the botanical researches on this plant formation, taxonomic, phytosociological and ethnohistorical approaches are abundant. In addition, interesting contributions from Ecology are also worth mentioning.

The field work methodology for this paper relied on the systematic construction of physiognomic-ecologi-

cal catalogues arranged in transects. The inductive approach of the first field days was rapidly combined with deductive analyses, which made it evident the relevant influence of local topoclimatic factors. The geographical conclusions reached in this study have been reflected graphically on a map and a vegetation profile.

### III. RESULTS AND DISCUSSION: INTERNAL UNITS IN THE JUNIPER WOODLAND

The Afur juniper woodland can be decomposed in a group of internal units, mainly differentiated on the basis of their floristic composition, physiognomic appearance (height and spatial coverage) and evolutionary tendency.

For the rugged orography of Afur, special remarkability should be given to the climatic gradations provided by altitude and local orientations. The vertical climatic gradients present along the altitudinal range - from 100 to 700 m. approximately- let us recognize manifestations from the three lower stages in the Canarian altitudinal vegetation belts model. Additionally, the deepening of the torrential courses determines the opposition on two main orientations of those slopes occupied by the juniper woodland. On the one hand, the slopes open to the mouth of Tamadite Ravine, which, for their north orientation, are overtly exposed to the local flow of humid air, act as windward-facing slopes. In contrast, those oriented to the headwaters of the ravine, where the south exposition is dominant, act as leeward slopes.

As different from the evident repercussions of the aforementioned topoclimatic factors on the vegetal cover, the role of edaphic influences is secondary. In parallel, the most important anthropic land uses are presently limited to the existence of two small hamlets situated in close proximity to the juniper woodland (Roque Negro and Afur), whose population hardly reaches an amount of 200 inhabitants.

Five main types of internal units have been distinguished: coastal xerophyllous scrub with junipers; xerophyllous juniper woodland; hygrophilous juniper woodland; fayal-brezal with junipers, and, scrubby substitutional communities.

The coastal xerophyllous scrub with junipers unit is endowed with physiognomic and floristic characteristics that can be said similar to those of *Euphorbia* scrubs, also known as coastal xerophyllous scrubs. Its most remarkable samples are located within altitude spans ranging from 100 to 300 m, in sites where orientation contrasts are not noticed.

The xerophyllous juniper woodland shows more similarities with thermo-sclerophyllous vegetation. In their particular location substantial variations indebted to orientation are not appreciated either. However, the units settling the leeward-facing slopes are higher in height than those inhabiting locations open to the north.

The principal differences between the hygrophilous juniper woodland unit and the dry juniper woodland are related to their floristic composition. They are fundamentally apparent thanks to the increasing relevance of the plants with a higher hydric demand (mesophytic and sub-hygrophilous), in comparison to the vegetal xerophyllous species, which are almost absent. On the other hand, the diversity of the thermophilous flora is also reduced, practically represented by junipers only, which are located in north-facing slopes. Above the humid juniper-woodland, where the altitude of the topography permits it, the vegetation evolves progressively into units more typical of dry evergreen laurel forest or fayal-brezal. Consequently, the fayal-brezal with junipers represents an intermediate stage into those communities featured by a rather hygrophilous type of behaviour.

Last, a wide variety of scrubby substitutional communities is appreciated. Its diversity is related to the various combinations of factors that might foster it: the existence of even three types of potential vegetation formations (evergreen laurel forest, thermophilous woodlands and coastal xerophyllous scrubs), different ways of anthropic action (cultivation in arable areas, goat grazing or hunting) and variations in the antiquity and intensity of the human pressure produced.

### IV. CONCLUSIONS

The Afur juniper woodland, as the most representative of the thermophilous communities in Tenerife, constitutes a great exponent of the two main traits currently featuring this type of vegetation: its diversity and discontinuity.

The most determining physical factors affecting the internal organization of the Afur juniper woodland are topoclimatic. Among these agents, the climatic effect of the local orientations, which are more prevalent than those of the vertical gradients, favours an arrangement of vegetal formations in mosaic, with lateral transitions that prevail even on their spatial articulation on altitudinal vegetation belts.

The higher humidity rates present in windward-facing slopes appear as a unifying ecological factor, which may

account for the reduction of the thermophilous flora. In close relation to this, it could be inferred that xerophilous juniper woodlands are endowed with environmental conditions more suitable for thermophilous vegetation, and therefore, they could be considered as more proximate to those more genuine samples of the Canarian juniper woodlands.

Although the preservation of the Afur juniper woodland is dealt with in several categories established within the regulations protecting natural spaces (Anaga Rural Park and World Biosphere Reserve), the recognition of its heritage value would demand redoubling efforts to guarantee not only its stability, but also its progression, from an ecological as well as a territorial point of view.