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RESEARCH ARTICLE

The Alpine population of Argentera Valley, Sauze di Cesana, Province of Turin, Italy: vestiges of an Occitan culture and anthropo-ecology

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The mountain community of the Argentera Valley, in the Sauze di Cesana municipal district, Province of Turin, Italy, stands as a simple world within the rationale of the evolution of living beings, blending biological development and genetics. This agro-pastoral population is a microcosm that has worked for millennia to improve its conditions and survival, by protecting pasturelands and raising livestock, determined by a sense of morality. Hence, the preliminary indication of the health of the territory: clean air, pure water, healthy soil, a limpid light because the air is free from pollution. Over the millennia, this community has maintained, as its central approach, consideration for its roots, feeding themselves and achieving an equilibrium in the process, thanks to the honest use of resources. Human life, the earth, water, livestock, are material goods, but at the same time are considered spiritual goods, hence the concept of “prioritising the territory” and with hard work, producing dairy products, the result of an expert balance of human practices, blessed by their Patron Saint Restituto, Martyr of the Theban Legion. This “path of milk and cheese” is the result of a history of five millennia that continues to keep the economy of this Alpine area alive. A knowledge of the good practices of the Argentera Valley is useful for creating public awareness and supporting ethical principles and good health.

Keywords: Alpine populations; megalithic culture; sustainable pasturelands; agro-pastoral tradition; dairy products; Dauphiné/Argentera Valley

Introduction

One cannot guess the future, but can prevent it. The future of the world commits mankind to a return to humanism in order to improve his condition by means of knowledge and a moral sense (Raisson, 2012). According to ONU and World Bank predictions, the world population should reach approximately 8 billion between 2020 and 2025. Life expectation at birth is increasing, especially in those nations that are contributing most to the population increase: India, China, Nigeria, Pakistan, Bangladesh and Brazil among others.

How many people can the earth support overall? Are there any factors or data that enable this limit to be determined? (Chiarelli, 2003). In particular, Spain, Italy and Portugal have, over the past 20 years, gone from being lands of asylum to countries of adoption, at risk of overpopulation and intercultural uncertainty (Chiarelli, 2003; Reginato, 2003). Agriculture, social and animal well-being, nutrition and the scarcity of water resources thus become the challenges for the new millennium, to ensure life on the planet. These new social situations make it clear that

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mankind is causing alterations to the earth's ecosystems, and that this situation has reached a point of no return, unless we apply specific controls over food resources, through deep-seated biotechnological innovations and with new energy-production methods (Chiarelli & Rivola, 2005). The theme underlying the "rationale of the evolution of living beings" (Scapini, 2005) indicates that new research in the sector should target ethical standards that respond more closely to responsible relations among human beings, in line with the themes proposed by this journal, *Global Bioethics*, founded by the International Institute for the Study of Man, inspired by A. Leopold (Chiarelli, 2005). This theme was already proposed in 2004 in Florence, on the occasion of the XIIth Conference of the Italian Evolutionary Biology Group. This paper explores the evolution and best practices employed by the mountain community of Argentera Valley, in the Sauze di Cesana municipal district, Province of Turin, Italy. This is an Alpine population in the Western Alps, a simple world that, throughout the "rationale of the evolution of living beings", has blended biological development and genetics. This agro-pastoral population (Molteni, 1996) has, during several millennia, maintained as its central approach a basic concept: the prioritisation of the territory (Molteni, 1996). The environmental elements of this rural area still remain: healthy air, clean water, healthy soil, light that is transparent because the air is free from pollution. Because of these characteristics, Argentera Valley, Sauze di Cesana has been accepted in the section "sustainable development of small rural communities" (Battaglini, Freccero, & Rabino, 2014) at EXPO MILANO 2015 (Figures 1–4). Figure 4, an age-group pyramid, represents the distribution of the resident population by age, gender and civil status at 1 January 2014. The population is subdivided into 5-year age groups on the Y-axis; the X-axis shows two mirrored bar graphs with male (left) and female (right) residents. The different shades show the distribution of the population by civil status: unmarried, married, widowed and divorced.

Population resident in the Sauze di Cesana municipal area, Province of Turin, Italy, between 2001 and 2013. Graphs and statistics drawn from ISTAT data at 31 December of each year.

General background

The population of Lo Grand Sauze, Argentera Valley, in the Occitan language *Sàuze'd Cesana*, has lived for millennia not with science but with a sentiment that promotes the "wheel of life". The

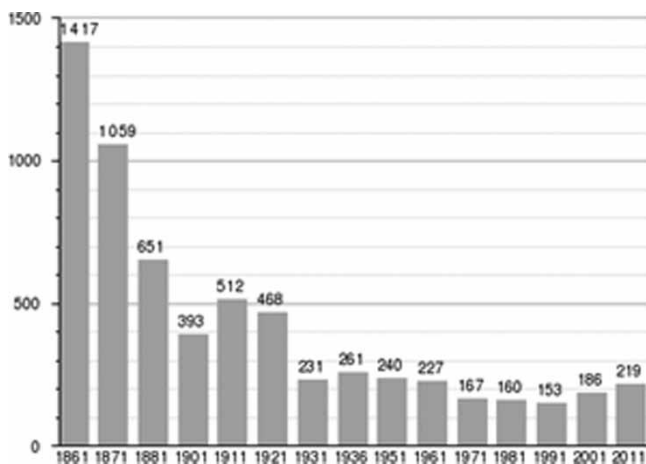


Figure 1. Historical demographic trend based on censuses of the population of Sauze di Cesana, Province of Turin, Italy, from 1861 to 2011. Percentage variations of the population, graphs and statistics based on data from ISTAT (Italian National Statistics Institute). There have been territorial variations in the municipal area over time: the historical data have been processed to make them uniform and comparable with the population resident within today's boundaries.



Figure 2. Resident population at censuses, Sauze di Cesana municipal area, Province of Turin, Italy. Data processing: TUTTITALIA.IT.

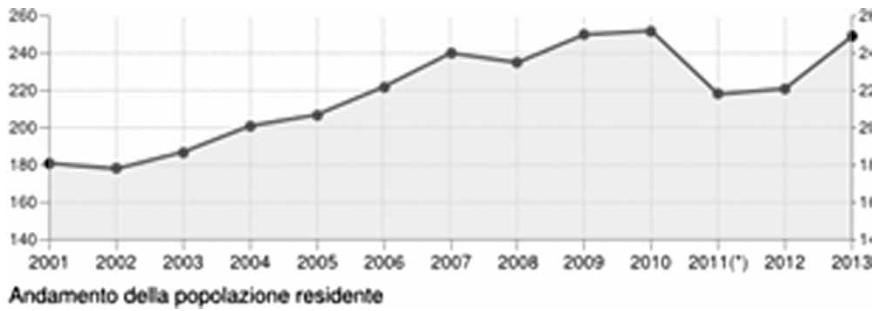


Figure 3. Sauze di Cesana municipal area, Province of Turin, Italy. Data: ISTAT, at 31 December of each year. Data processing: TUTTITALIA.IT post-census.

roots of this small community go deep into the remote archaeology of the High Alps, which are still used as pastureland. At the entrance to the valley, in spring 2007, at the suggestion of a resident, Mr Mario Castagnasso (the elderly husband of Maddalena Manzon, members of an atavistic family), research began to determine the existence of megaliths.

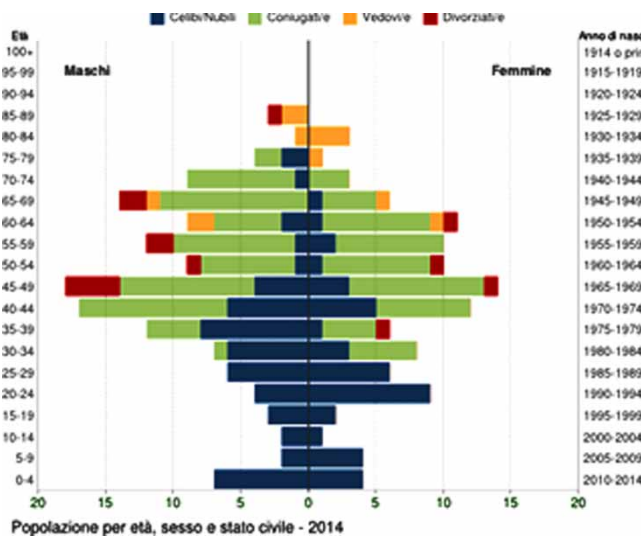


Figure 4. Sauze di Cesana municipal area, Province of Turin, Italy.

The reports concerned an area that may be reached on foot from the village, through the Serre hamlet and across the Ponte Terribile bridge, towards the locality Giu di Gaià at the Ciagrassa bridge. The Prehistoric Art Museum and Study Centre, with the Civic Museum of Archaeology and Anthropology of Pinerolo, in the Province of Turin, Italy (CeSMAP New) thus organised a research team. From preliminary investigations, it was determined that the site is oriented astronomically: by means of instrumental and Global Positioning System (GPS) satellite surveys, the team determined the astronomic north.

The valley of the river Ripa extends for several kilometres, rising gradually, from north-west to south-east. During the inspection of 10 June 2007, having examined the geological conformation of the zone and the geography of the horizon, embedded stones were detected and their number and disposition were determined preliminarily; this was done with a measuring tape (method adopted by triangulation). In particular, the presence was noted of a mound-like structure with traces of dry stone masonry, situated approximately 50 m from the embedded stones. The researchers' attention concentrated more specifically on a large erratic mass: 44.55.243 N, 006.53.254 E; altitude above sea level: 1745 ± 5 m; height of the mass: 6 m approximately from ground level. Should this mass, in subsequent research, be determined to be an archaeological find, its archaeo-astronomic potential could be checked on site.

As populations with megalithic culture settled in the area, the mass might have been used as a "viewfinder", since at sunset it acts as an indicator of the summer solstice in relation to certain standing stones. In subsequent years, other masses have been found, photographed and measured; these are positioned to form a "cursus" on two parallel lines with some central standing stones. The etymology of *cursus* was coined in the eighteenth century by William Stukeley, who pioneered the archaeological investigation of the prehistoric monuments of Stonehenge and Avebury.

This arrangement in rows leads to implications concerning the site's possible antiquity, and studies are still underway to ascertain with precision how many masses actually form part of the site. The menhirs central to the *cursus*, numbers 2, 12, 21 and 30, appear to lie in a straight line (Seglie, 2009). In general, an agglomerate of monoliths was constructed to confirm a site's sacredness, however, one must first consider the causes that may have led to this site being considered sacred, and the reasons why a group of people travelled up the Ripa Valley and settled there, and constructed an agglomerate.

The site, lying at the entrance to the valley's pasturelands, demonstrates that agricultural, food-producing activities have been carried on here uninterruptedly, activities that have served for human survival aimed at the production of cheese.

Mario Alinei, from the University of Utrecht, has carried out interesting research related to the discovery of "rennet" and the diffusion of a new foodstuff: cheese. The study examined the essential elements of these activities spread across the Midi area of France, a mountainous area suited to the development of transhumance, and known for its Neolithic culture with a pastoral economy (Alinei, 2009). It should be added that the presence of grasses such as *Galium verum* (Boano & Bouvet, 2000–2002) contributed to the production of rennet and the typical local cheese: *toma*. These grasses form clumps that colonise relatively deep limestone soils. The Neolithic settlement and the distant agro-pastoral origins of the place confirm that genetic interaction with the environment has, over the millennia, consolidated the sense of life of this population. The production and trade of dairy products like cheese and milk (Alinei, 2006) remain dominant aspects of the way of life of this mountain community.

Traditions, customs and costumes

The population's quality of life makes the Argentera Valley, in the Sauze di Cesana municipal district, significant. Sauze di Cesana is a very old rural village with plentiful water that already

existed prior to Roman times. In the Early Middle Ages, it spread along the route leading to France. During this period it became a large village, thanks to its vital elements, which ensured the survival of its livestock and hence the well-being of its inhabitants. This territory was part of the French Dauphiné, and signs representing its domination can still be seen, sculpted in the churches and fountains (Figure 5).

The Dauphiné was a French district that included the provinces of Isère, Drôme and the French–Italian Alpine districts known as the Escarton. These were subdivided into five cantons:

- (1) Canton of Briançon, from Valle Argentera to Saint-Gervais-les-Bains.
- (2) Canton of Château-Queyras, from Guillestre to Colle delle Traversette.
- (3) Canton of Oulx, from Cesana to Bardonecchia.
- (4) Canton of Pragelato, from Colle del Sestriere to Perosa Argentina.
- (5) Canton of Casteldelfino, from Casteldelfino to Sampeyre.

With the Treaty of Utrecht in 1713, this part of the French territory was ceded to Savoy. In particular, Sauze di Cesana, in the Cottian Alps (*Autas Aups*, in the Occitan language) and once an integral part of the Escarton (Fauché, 1856; Ferrari & Pepino, 2013), is today in the Province of Turin. Compared to other parts of the Dauphiné that are now in the Province of Cuneo, it was a true cultural and political community, in close contact with Briançon, the pivotal city of the Escarton.

The cross specific to this area, with typical arms and symbols, used to be donated to brides who kept them as a mark of recognition of the family, showing common roots. This cross, which bears the fleur-de-lis on its central arm, would have been pinned with a simple safety pin (not a gold chain) to fasten the small shawl that was worn over the typical Occitan dress. This jewel is still worn today, but only on special occasions such as weddings, christenings and celebrations on the day of the patron saint, which are followed by dancing. These practices are similar to those of the inhabitants of Briançon.

The most important monument of this community dates to the eleventh century. This is the cemeterial church of Saint Restituto, Martyr of the Theban Legion, patron saint of the village. The church appears to the visitor high up on the mountainside, like a fort constructed to protect and dominate the village. Here time seems unchanged and is told by the sundial on the church tower. It all seems very natural. An interesting detail is that the church stands on a



Figure 5. Sauze di Cesana fountain, seventeenth century. Symbols of the Dauphiné and the fleur-de-lis.

spring of water, which was once the site of an older pagan temple, confirming the patron saint's life history and martyrdom (Figure 6).

The development of best practices linked to the pastoral economy follows natural and spiritual rhythms, with an awareness of death, giving rise to continuity through procreation and good teachings dedicated to one's children.

The concept of this way of life is engraved on the ancient stone of the baptismal font in the church; its lower part is sculpted in the form of a shell, with above highly sculpted forms representing work and honest labour. Above the stone font is a tall carved wooden cover bearing two fern leaves, one male, the other female, symbols of the fulfilment of offspring (Molteni, 1996) (Figure 7).

Food provision in this part of the world, in the past and the present, is safeguarded through the transmission of the sense of life: balanced between *life* and the *provisions of mother earth* (Molteni, 1996). In this municipality, families of ancient stock reside: Berton, Perrachon, Manzon, Merlin, Prin Abeil, Prin Clari, Prin Derre. This community is based on strong religious values, with deep roots going back centuries, like an umbilical cord that has never been cut. For this population, Saint Restituto is their inspiration for living and a guide for future progress, their lives proceed with a constant rhythm of religious feasts throughout the calendar year, almost as though this saint were their icon, their "nutrient" (Molteni, 1997; Vivier, 2002), a spirit capable of creating a state of harmony between man and the earth; the element that keeps this place healthy and intact, with its air, its water, light and high-quality dairy products. This sentiment is the legacy of a social nature acquired through remote experiences (Merlin & Molteni, 2014), though in continual evolution.

The causes of depopulation

The herders of Sauze are today "agricultural entrepreneurs" and the consolidation of their activities, in the present and the past, has led them to practise transhumance. This takes them to the lower valley, to areas neighbouring the municipality of Turin: Candiolo, Coazze, Giaveno, Verolengo, Carmagnola, Pianezza and Druento. On 14 July 1962 (Merlin & Molteni, 2012),



Figure 6. The "Wheel of Life" in Sauze di Cesana's Saint Restituto church (eleventh century), a sign that is useful for promoting human "good living".



Figure 7. The eleventh-century Saint Restituto church: details of the christening font, with male and female signs symbolising life.

however, a traumatic event occurred which marked this community, a violent fire destroyed the entire village, 114 chalets, and with them centuries of Occitan culture linked to livestock and the earth (Merlin & Molteni, 2012). Before the fire, during the winter the herders used to come down from the Argentera Valley to the village with their hundreds of head of livestock, which were accommodated in the ancient chalets; these were built to store sufficiently large quantities of forage in the upper storey beneath an open roof.

The fire instantly changed these ancient practices; in many cases, whole families of herders abandoned the pastures, sustained by the economic boom of the 1960s. Thus, there was an exodus, even though the population was never entirely cut off from its roots.

The archetypes of the collective unconscious (Jung, 1935) are indeed present in the psychism and are manifest in the individual and social lives that they influence (Jung, 1935). In the town-hall square of Sauze di Cesana, at dawn every year in the month of May, one can witness the return of the herders with their livestock. The earth and the bridges over the river tremble with the uproar, the din continuing all morning. Thus, the health of this territory remains deeply rooted in the connection between its inhabitants and the earth and the natural passage of the seasons. The “hard but joyful life”, of Sauze di Cesana, is free of melancholy (*mélos* = black, *cholè* = bile, *chýo* = pour sadness) (Voltaggio, 2003). Depression is not a characteristic of this

population, which has conserved archetypal manifestations, which arise according to circumstances of historical time and predispositions of the collective consciousness. The extended families of today's herders are in continual contact with one another thanks to modern technology: modern communications technology and methods of transportation, motorcycles and off-road vehicles, allowing quick access to the mountain pastures.

The cheerfulness of these “agricultural entrepreneurs” derives from psycho-ethological and socio-environmental factors, which are dynamic elements (Canobbio, Telmon, & Scheuermeier, 2007). The herders have different roles and jobs depending on their sex and age, but all of them have affectionate relationships with: heifers, goats, sheep, bulls and their dogs.

These relationships involve communicating with gestures and cryptic sounds made up of tones and commands, some harsh, some slow, but all interactive. This type of communication is incomprehensible to those outside this world. The “man–animal” coexistence is not monotonous, but creates relationships and stimulates learning. From their tiring but well-loved work, the villagers derive a sane livelihood. An awareness of material goods, safeguarding the territory, the necessity to trade dairy products, are at the foundation of their subsistence, these are their best practices.

Characteristics and products of the earth

The agro-pastoral production is essentially based on “noble” milk, butter, cheese, honey and potatoes, which are hard in texture, known as *dauphinoise potatoes* (Doucet, 2014), thanks to the particularly hard soil that is found on mountains of scree rocks.

The flora of the Argentera Valley is not treated with pesticides; it is healthy because of the constant territorial defences practised by these small rural communities, attentive to the ecosystem and uncontaminated water. The most common flowers are the following: *Semprevivum montano*, *Stipa pennata*, *Arnica montana*, *Aquilegia alpina*, *Anthericum liliago*, *Eritrichium nanum*, *Campanula spicata*, *Carlina acanthifolia*, *Cardis nutans*, *Echinops sphaerocephalus*, *Galium verum*, *Nigritella nigra*, *Gentiana criciata*, *G. lutea* and *G. kochian*, *Paradisidium liliastrium*, *Verbascum thapsus*, *Hepatica nobilis*, *Chrysanthemum alpinum*, *Epilobium angustifolium*, *Muscari botryoides* and *Asphodelus albus* (Imprenditore agricolo, n.d.; Di Maio & Garibaldo, 2011), flora that contributes to and characterises the taste of “noble milk” throughout the seasons. The transformation of milk into butter and cheese, such as Plaisentif, the so-called “cheese of violets”, Reblochon, Murianen and Bruscol Milk, are primary sources of income in this Alpine economy (Battaglini & Fortina, 1992).

Nutritional aspects

The small-chain dairy industries and related pastoral farming systems are still today one of the most satisfying ways of conserving human activity in the mountain environment, and are fundamental for the protection and control of a difficult and complex territory (Battaglini, Bovolenta, Gusmeroli, Salvador, & Sturaro, 2014).

Studies on the quality of the cheese have determined levels and variability of nutritionally favourable fatty acids (FAs) in traditional cheeses (e.g. with protected designation of origin) produced in the Alpine areas of Piedmont (NW Italy) (Renna, Lussiana, Malfatto, & Battaglini, 2014). These cheeses are also produced in the Susa Valley (e.g. Toma del Piemonte) and present amounts of FAs of high nutritional interest (e.g. high total conjugated linoleic acid (CLA), $\omega 3$, low $\omega 6/\omega 3$ ratio) with positive biological effects in terms of preventing cardiovascular diseases and cancer (Battaglini, 2014). This research points to the effects of pastoral farming

systems on animals' diet, and consequently, the presence of these natural molecules in milk and dairy products.

Another recent study on milk quality in this territory was the “Noble Milk” project (high-quality drinking milk). Its aim was to improve the competitiveness of mountain dairy farms, and it was promoted by the Piedmont Regional Government through the Rural Development Programme 2007–13. The primary objective was to define production regulations for drinking milk, produced by cows mainly fed on local fresh grasses and hay. The experimental trials within the project aimed to obtain data on all stages of the production chain, from the characteristics of forage resources to those of herds, including the chemical, microbiological and sensory qualities of milk. “Noble milk” possesses high nutritional value and healthier properties than the milk available in the Piedmontese retail market. The ratio of polyunsaturated fatty acids of the series $\omega 6$ and $\omega 3$ was below 2 throughout the year, and the concentration of total CLA isomers, in summer, reached an average value of 1.35 g per 100 g of fat. Sensory evaluation of the milk (untrained panel) and fresh cheese (trained panel) showed that “noble” dairy products are clearly distinguishable and preferred over analogous purchased products (milk) or products produced with milk purchased at retail markets (Lombardi et al., 2014).

Ecological and conservation aspects

Appropriate pasture management can contribute to soil conservation, differentiating ecological conditions for different soils.

This creates several different pasture vegetation types, a unique and valuable patrimony in terms of biodiversity and the ability to sustain local productions. Pasture biodiversity is a determinant in the qualification of animal products, giving typical characteristics related to the aromatic compounds present, and health-promoting properties linked to the functional substances transferred from the plants ingested by grazing animals to the animal products (Battaglini et al., 2014). This type of livestock farming, and the related dairy production, are appropriate for low-input mountain systems. Instruments such as Life Cycle Assessment (LCA) highlight the importance of farming based on grazing favourable to maintaining the fragile and dynamic environmental balance of these areas (Battaglini et al., 2014).

Social and cultural aspects

Milk production is one of the most gratifying possibilities for preserving human activity in mountain environments, and is vital for protecting and increasing the value of the qualitative properties of the commodities and their by-products, not least from an economic standpoint.

The sustainable use of natural mountain resources and their improvement constitute an ethical value, which must be popularised to create public awareness: ecosystems must be respected and protected against environmental deterioration, which uninformed human presence might create. From a social and cultural standpoint, some factors are essential: the willingness of farmers to renew farming styles to meet these requirements, the ability of society to assist them with this process, and the capacity of society to describe Alpine cultural landscapes and valorise them in the cultural and ecotourism market. However, one must also take into consideration that this sector differs widely in terms of its environmental context, production targets, degree of intensification and cultural role. The traditional breeding system in the Alps is largely based on the use of meadows and pastures, which produce not only milk and meat, but also other fundamental positive outcomes and ecosystem services, such as genetic resources, water flow regulation, pollination, climate regulation, landscape beauty, recreation and ecotourism, and cultural heritage. The loss of traditional breeding competitiveness and “modest” mountain cows have, on the one hand,

pushed farming towards an intensification of livestock productive models in favourable areas, and, on the other hand, led to the abandonment of mountain pastures, especially in areas where services are scarce, and are in the “background” as far as the tourist industry is concerned. The negative spin-offs have been: loss of architectonic identity, loss of territory–breeding–product links, deterioration of the vegetation, with adverse effects on animal and plant biodiversity. The Alpine environment and land diversity are a unique patrimony, typified by the Argentera Valley. It is an important self-sufficient livestock reality that courageously breeds dappled and local breed animals, with a positive spin-off for animal biodiversity: it provides nourishment for the world and supplies energy for life. The Argentera Valley is a Site of Community Importance (SIC), European Community Directive No. 43 of 21 March 1992. Council directives concerning the preservation of natural and semi-natural habitats of wild flora (plants) and fauna (wildlife) are known as the Habitat Directive.

This site needs sustainable development and its treasury of values must be safeguarded (Bailoni et al., 2005; Battaglini & Fortina, 1992).

Discussion and in-depth research

In the 1970s, the Institute of Ethnology and Anthropology of the University of Turin, Italy, published an impressive research project entitled *Population and Depopulation of an Alpine Valley: The Anthro-ecological Research in the Val Varaita and Testimonies of Occitan Culture* (Chiarelli, 1976). This research examined the genetic characteristics and lifestyle of some populations situated along the Piedmontese Alpine range and in the Aosta Valley. In particular, the study aimed to evaluate the isolation and homogeneity of these peoples.

The historical reconstruction was based on identifying and correlating bio-demographic parameters. The findings made it possible to analyse the structure, biotransformation and microevolution processes characterising such a population. In collaboration with the Université de la Méditerranée, the Dauphiné Area Project was started. This multidisciplinary project aimed to reconstruct the anthropological and genetic history, and the adaptation to the environment, of certain mountain populations. Both French and Italian parts of the Dauphiné were included. The diets of each community were analysed. Anthropology is concerned with human diets beyond the simplicity of simple nourishment, analysing also social roles and adaptation.

Since diet is a good indicator of environmental adaptation, quantitative and qualitative characteristics and transformation over time and the correlation with ageing were taken into consideration. Finally, with the intent of examining the genetic component of longevity, family trees were drawn up to evaluate longevity in various families (Rabino, 2001; Rabino, Girotti, Boano, De Iasio, & Prost, 2013). The results of the research revealed differences in demographic structure, evolution and ageing of the study population.

Disclosure statement

No potential conflict of interest was reported by the author.

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