EDICIÓN ESPECIAL: ETNO-ORNITOLOGÍA

ETHNO-ORNITHOLOGY AND HISTORY OF THE MAPUCHE FOWL

Etno-ornitología e historia de la gallina mapuche

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RESUMEN.– El estado de conservación de la gallina mapuche, que incluye los subtipos *collonca* y *quetro*, estaba seriamente amenazado a fines del siglo pasado. Su presencia en comunidades mapuche en la Región de La Araucanía era escasa y su empleo en rogativas como el *Nguillatun* era solo esporádico y desconocido para las nuevas generaciones. En este trabajo se da cuenta de su etno–ornitología, su historia y del modo de herencia de sus caracteres morfológicos, que podrían explicar la alarmante disminución de su población durante el siglo pasado, y su recuperación sostenida durante los últimos años. Prospecciones a principios de este siglo (2000–2004) daban cuenta de individuos aislados dentro de planteles caseros en localidades rurales apartadas. El tipo más escaso era la gallina *quetro* (con aretes), presente solamente en cinco localidades, todas ellas fuera de la Región de La Araucanía. La conservación *ex situ* por clubes especializados en Norteamérica y Europa, a partir de un reducido número de individuos importados durante la primera mitad del siglo XX ha seguido directrices de exhibición más que de preservación genética de la raza. El rescate y multiplicación de ejemplares remanentes y su reintroducción a comunidades mapuche, junto al apoyo en difusión por programas de televisión, han potenciado una rápida revalorización de *colloncas* y *quetros*, y sobre todo una importante recuperación de la memoria ancestral de su rol para el pueblo mapuche.

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When I was studying a postgraduate degree at Reading (United Kingdom) back in 1998, I was contacted by the Secretary of the *Araucana Poultry Club of Great Britain* (www.araucana.org.uk), which gathers some 300 fanciers of the Mapuche fowl (*Gallus gallus domesticus* L.) from Chilean origin. Their distinctive blue or green eggs, sold in exclusive stores in London, indicate how much the British appreciate genetic diversity and conservation of the Mapuche fowl. They are highly regarded by their breeders and fanciers for their rusticity and adaptation to hostile weather such as that of the British Isles. Also they appreciate their remote provenance from the Mapuche people, who were never conquered by the Spanish, and so had the least opportunity to interbreed their livestock with incoming European breeds (Roberts 1997).

As I was delivering an invited speech on the Mapuche fowl abroad to members of the Mapuche communities from around Villarrica (La Araucanía Region) at the Pontifical Catholic University of Chile in 2001, I could perceive a special and unexpected pride among those present. At that time, few young Mapuche spoke their native *Mapuzungun* language, and were uninterested in the 'relatos' (stories) of their grandparents about religious ceremonies in which the Mapuche hen plays a central symbolic role. That same year, Itziar Cerdán, a student from Universidad Pública de Navarra (Spain), took a census of Mapuche fowl in the communities around Villarrica, finding only a few *colloncas* (rumpless) and a total absence of *quetros* (with ear tufts) (Cerdán 2001). A similar situation was observed among the Mapuche Lafquenche (meaning people from the coast) area between Cañete and Tirúa, some 100 km south of the Arauco Peninsula in 2004, where the blue egg trait together with rumplessness were scarce, and ear tufts were completely absent.

A wider search between Cabildo (32°25'S 71°04'W) and Osorno (40°35'S 73°06'W) by the author (J.A. Alcalde, unpublished results), found *quetro* specimens as isolated individuals in peasant farm flocks, though not necessarily in Mapuche households, nor within the La Araucanía Region. As will be explained later, the

low number of these *quetro* chickens is associated with the lethal character of the gene responsible for this trait, and the need for express anthropic selection when bred in mixture with other chickens. Lost knowledge about the trait together with difficulties in recognizing ear tufts as different from muffs and beard, had led to a critical scarcity of *quetros*, estimated at 30–40 individuals.

During the filming of an episode of the television program 'Tierra Adentro' in the Mapuche Lafkenche area, I took a young *quetro* cockerel as a present to José Manuel Rebolledo (Forestry Engineer and prominent promoter of the Mapuche fowl in Arauco). I had bred this *quetro* from a rooster I found by the central train station in Santiago, who's provenance was Alhué, a location south of Melipilla in the Metropolitan Region. The Patriarch, as he named it, was the founder of a breeding nucleus with two or three *collonca* hens given as present to him by women from the Lafkenche communities. New additions to the breeding stock followed, with *quetro* and *collonca* males and females found nearby. Rebolledo bred several couples to be re–introduced to eleven communities in the Lafkenche area, following long conversations with the old people, in order to collect as much information as possible about the cultural significance of the Mapuche fowl, to ensure successful reintroduction.

These re–introductions, backed by divulgation of the Mapuche fowl sponsored by television programs that followed, were very successful and the number of *colloncas* and *quetros* has steadily increased ever since in that area and beyond. The aim of this article is to give a brief report of the experiences, people and facts that have allowed a re–valuation and recovery of the Mapuche fowl and its role in Mapuche culture. The hypothesis behind this work is that the physical presence of this fowl in Mapuche communities can assist or catalyze the recovery of the ancestral remembrance associated with it, which passes on to the newer generations. This hypothesis is backed by the mutual dependence between biodiversity and cultural diversity, where a loss of cultural knowledge can reduce agricultural biodiversity, and very probably the inverse process is also true (Soriano, cited by Castro & Romo 2006). This article reviews what is known to date about the ethno–ornithology of the Mapuche fowl, part of which has been collected by the author and collaborators after reintroducing chicken specimens to Mapuche communities. It also covers how the inheritance of the main traits associated with the Mapuche fowl may have influenced its abundance, decline and recovery alongside historical facts, and ends with an account of its present status of conservation.

Ethno–ornithology

In the context of this work, 'ethno–ornithology' deals with the significance that some birds have for human cultures. The Western world gives the domestic chicken a role as food source of meat and eggs, but for some Polynesian and South American cultures the chicken additionally has religious and symbolic significance. For example, Polynesians from the Society Islands had a rooster drawn in the sails of their vessels to protect and guide them in their long voyages (Fig. 1). The chicken was so highly regarded in South American cultures that one of the last Incas named himself 'Atahualpa' to unite the Empire north and south of Cuzco, as the chicken was called *achawal* to the south and *hualpa* to the north.

While much ethnology of the Mapuche fowl concentrates on the role this bird plays within the Mapuche culture, interest goes beyond this to include farmers and fanciers who keep it worldwide (Carefoot 1990), and the scientific community that studies this fowl as a genetic subject and as an anthropologic trace of human migrations (Storey *et al.* 2007, 2008, Gongora *et al.* 2008). All these aspects are interrelated and can be considered as part of the ethno–ornithology of this chicken.

As indicated earlier, recovery of the Mapuche fowl within the Lafquenche area of Chile (coastal district of the La Araucanía Region) involved not only its role as an economic and food source, but became a catalyzer for the recovery of ancestral remembrance and as an element for re–connecting elder and younger generations. As seen with the communities around Villarrica, a process of recovery of Mapuche cultural pride, in which the Mapuche fowl plays an important role, had already started. These changes were evidenced by the author during several visits to Mapuche communities in this area in the following years after 2004.

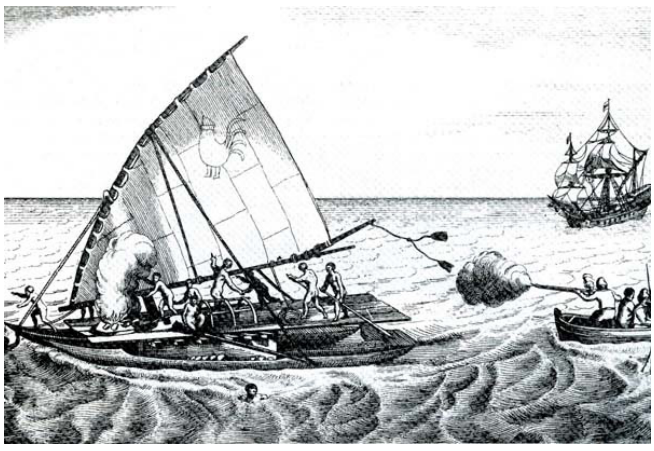

Figure 1. Polynesian vessel showing a rooster in its sail as a symbol of protection and guidance. Engraving from Schouten's journal, 1618, depicting the encounter of his ship De Eendraght with a catamaran somewhere in mid-Pacific, to the North-West of the Society Islands.

Historically the Mapuche have considered their fowl as sacred. In particular, the *collonca* has been an important element for mediating with the spirits in religious ceremonies including the *Nguillatun* (where the *machi* or shaman officiates with the community) and the *Machitun* (where the *machis* gather themselves). Blood from a slain *collonca* of a certain color is diluted in water in the *mol–mol* and spilled by the *machi* in a circle around the ceremonial ground, starting from the east to venerate the rising sun *Antü*. A black hen is used to plead for good weather, a white or buff for rain (Mora 2005). As Leonel Lienlaf (prominent Mapuche poet and writer) explains, if the number of *colloncas* were diminishing, so was the power of the Mapuche people to intervene in the eternal fight between land and sea, *Trentren* and *Caicai* according to Mapuche mythology in a country of earthquakes, tsunami, volcanoes and much more, to ask for the growth of the vegetation and good harvests. Therefore, Lienlaf explains, the relation with their fowl goes beyond a food resource, being an important inhabitant of the territory as a whole.

Apart from the *collonca*, the *machi* has the *kultrun*, the ceremonial drum (Fig. 2). According to María Ester Grebe, an expert in Amerindian musical instruments, the drawings on the skin of the *kultrun* symbolize the Mapuche cosmic vision (Grebe 1973). The circular surface of the drum is divided by a cross marking the four cardinal points, each direction ending in three lines as symbolic chicken feet, which in turn divide the perimeter of the drum into twelve portions to denote the yearly cycle.
Some Mapuche families, Lienlaf tells us (personal communication 2004), used the *collonco* rooster as a heraldic symbol, which provide protection from evil spirits. As such, the sudden death of the rooster falling bloodless to the ground is interpreted as the *collonco* giving his life to protect a member of the family from an illness or from a bad event.

Figure 2. Kultrun the Mapuche ceremonial drum showing the drawings that symbolize Mapuche cosmovision. The skin surface is divided by a cross in four cardinal points, each quarter has a star, the moon or the sun depicting the sky. The lines in the cross end in chicken feet dividing the perimeter of the drum into twelve segments symbolizing the calendar months. Open source image.

The value that the Mapuche give to *colloncas* and *quetros* has been a clue to their persistence until the present, and also explains why it was almost lost towards the end of last century, as result of cultural oppression and erosion experienced by Mapuche communities. Inheritance of the key morphological traits of the Mapuche fowl, as will be explained below, determines that when they are bred together with ordinary chickens (tailed and tuftless) their allele frequency is progressively reduced in the population until it disappears. Hence, anthropic selection is a requisite to maintain their numbers in a breeding flock. This form of inheritance demonstrates that the Mapuche favorably selected the *collonca* and *quetro* types. In fact, historical records say that Chief Quiñenao, who lived during mid nineteenth century, preferred tailless *colloncas* because they escaped better from foxes (Castelló 1924).

An ancestral 'relato' (tale) made known by Leonel Lienlaf in 1990 in a conversation with the researcher Eugenio Salas in Temuco describes how the Mapuche received this fowl and committed to take care of it, as an allegory of the process of domestication. This tale is transcribed as follows:

"*... to a place between Chapuko y Fucha Fotra, some birds came flying one day, which came to be* wûñum *(chicken), the birds were on voyage but the journey was long so they stopped, nested and laid eggs. A man that lived nearby wanted to know about these birds, so he cut the tree down, and so the birds fell. Big was his surprise, the eggs were blue because their evolution was not yet complete, the old people said that their destiny was another (another bird), maybe* wûdu *or maybe* manque *from the sky (condor), they say the old man said. Then they saw the tree bleeding, that red was the blood from the tree, as that of a Christian they said it was. So the old men gathered, they made a council, and so became the keepers and guardians of this bird the Mapuche, to repair the damage done. But the birds still remember their other land, so at night when the day is about to come they sing,... they sing... flap their wings to prepare for the flight,... they sing and lean their heads to listen how the birds from the sky respond...*"

Inheritance of main traits

As was mentioned earlier, inheritance of two of the three main characteristic traits of the Mapuche fowl is difficult. The autosomic dominant gene that confers ear tufts (*Et*), described only in the Mapuche fowl, is lethal when in homozygous *Et Et* condition (a similar case as that of the classic example of the *Creeper* gene that confers abnormally short shanks in chicken). The *Et Et* chick

dies in the egg three or four days before hatching time, due to malformation of the throat and ear channel (Somes 1978). In heterozygous *Et et* condition the chick is viable, though survival rates are lower. The consequences of this kind of inheritance is that ear tufted birds are 99% *Et et* (Somes & Pabilonia 1981), and if crossed with each other will always have a proportion of non–tufted chicks (*et et*) in the progeny, making impossible to fix the trait in the breed. Therefore, a mean of 25% of the chicks die before hatching (those *Et Et*). Considering these and the higher perinatal mortality of the heterozygous, the proportion of surviving tufted chicks is usually around 50%. Mutations in two genes have been recently associated with this trait: *TBX1* encodes a protein linked to neuropsychiatric disorders, and *GNB1L* encoding a transcriptional regulator of embryonic development (Noorai *et al.* 2012).

The rumplessness of the *collonca*, controlled by the incompletely dominant autosomic gene *Rp*, is associated with reduced fertility and a higher embryonic mortality during the last days before hatching (Dunn & Landauer 1934). Reduced fertility is explained by copulation difficulties in absence of the tail, as saddle feathers obstruct the vent of both male and female. In normal copulation, both male and female set their tails aside exposing their vents for effective contact. Higher embryonic mortality of *Rp Rp* o *Rp rp* chicks is associated with malformations involving caudal vertebrae. Noorai *et al.* (2012) have identified two genes *Irx1* and *Irx2*, which determine developmental patterns in *Drosophila*, rat and zebra fish, as causing rumplessness in North American Araucanas.

The blue egg trait or *Oocyan* (O) is autosomic dominant, *i.e.* both *OO* and *Oo* express high concentrations of biliverdin in the eggshell (Punnett 1933). This trait is present only in two chicken breeds in the World, the Chinese Dongxiang (Zhao *et al.* 2006) and the Mapuche fowl; and of course in those derived from them. The structure of the gene has recently been deciphered for Dongxiang (Wang *et al.* 2013) and for the Mapuche fowl (Wragg *et al.* 2013), finding that despite being independent mutational events, structural similarities are surprising (*i.e.* both consist on the insertion of an *EAV–HP* retrovirus upstream of the *SLCO1B3* gene encoding for a biliverdin carrier protein, causing an organ–specific over–expression of the latter in the oviduct). Independence of each other is demonstrated by a 23 bp shift upstream of the insertion site of the Mapuche fowl *EAV–HP* retrovirus in relation to that of the Dongxiang chicken.

Therefore, the mode of inheritance of the three main defining traits of the Mapuche fowl depicted so far, explains that the scarcest type is the *quetro*, that *collonca* abundance is moderate, and that blue egg layers are widely dispersed around the Chilean countryside (the character being dominant, non–lethal and striking to most human eyes). Inheritance also explains the practice of breeding *quetros* and *colloncas* together to reduce lethal losses (unhatched eggs), and to obtain '*colloncas* de aretes' (tufted rumpless), albeit in lower frequency (Fig. 3).

History

The Mapuche fowl was made known to the scientific world in 1921 by Salvador Castelló during the First World Poultry Congress in The Hague, Netherlands. He came to know this fowl at the Santiago International Fair in 1914 while visiting Chile as director of the Royal Poultry School of Spain, and was impressed by this singular blue–green eggshell color and the ear tufts protruding from each side of the head. Such was his enthusiasm that he baptized this hen as a new species *Gallus inauris* Castelloi, under the hypothesis of a possible hybridization with a South American gallinacean as the source of the blue egg trait (Castelló 1924).

What Castelló saw in 1914 and showed to the scientific world as the Araucana chicken were in fact the rumpless tufted birds of Mr. Rubén Bustos (a well–regarded poultry breeder of the time), which came from the cross between the two types of Mapuche fowl, which he managed to obtain from different Mapuche communities in the South of Chile. Based on this '*collonca* de aretes' type promoted by Castelló, fancier club standards were established in North America and Europe, adopting the name of Araucana that Castelló proposed (Wilhelm 1953).

Later Bustos explained to Castelló that the original Mapuche fowl types were the *collonca*, a rumpless blue/green egg layer, and the *quetro*, an ear–tufted normal tailed chicken that usually laid light brown eggs. While

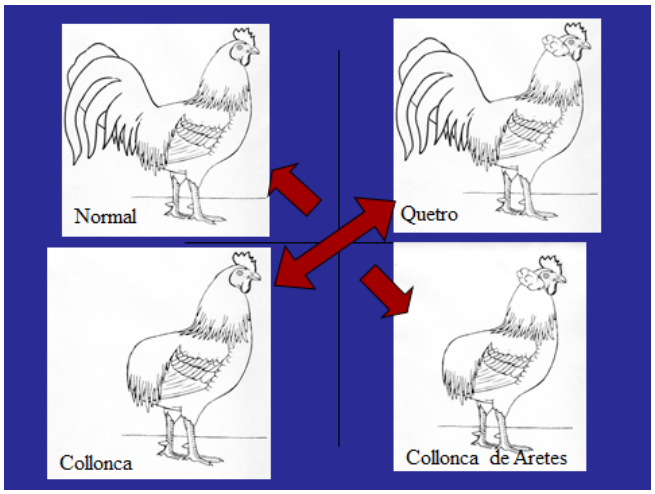

Figure 3. Combining *colloncas* and *quetros* to obtain *collonca* de aretes and reduce mortality losses from *Et Et* genotype. Image from the author.

serving in the army in 1880 in the South of Chile, Bustos got his *colloncas* directly from Chief Quiñenao in Quillén, in northern Araucanía, and his *quetros* further south from Chief Michiqueo Toro Mellin in the mountains of Ñielol (Bustos 1922). He crossed both types and exhibited only those which carried the three traits, the '*collonca* de aretes', a type which was normally very scarce in Mapuche communities.

In 1927 and again in 1948 the National Geographic magazine from USA published articles about the 'Araucana chickens', which greatly promoted the breed and raised much interest in importing specimens from Chile. Mr. Juan Sierra, an important breeder of these chickens, sent five specimens to found the breeding stock for Mr. Ward Brower Jr. in 1930, from which most North American Araucanas descend. Something similar happened in the UK and Germany, and fancier clubs were founded which went through good and bad times. Although studies show high genetic homogeneity among birds kept by these clubs (Wragg *et al.* 2013), emphasis in exhibition rather than genetic conservation determines that fanciers are open to outcrossing followed by backcrossing their specimens for the sake of morphological perfection (Carefoot 1990).

After spending a research period at the University of Berkeley in California in 1944, Dr. Ottmar Wilhelm learned about the work of R.C. Punnet who established the dominant mode of inheritance of the oocyan trait of the Araucana chicken. Back at the Universidad de Concepción, Wilhelm started a long term project to study and recover the Mapuche fowl, collecting over 100 hens from peasant farms around Concepción and Temuco, and established a genetic program by crossing the hens with barred Plymouth Rock and black Minorca roosters. He developed four lines: a heavy one with meat aptitude, a light one with good laying ability, a black naked necked line, and what he called the 'atavic recessives'. Crossing with other breeds such as Plymouth Rock and Minorca allowed Wilhelm to study the genetics of the Mapuche fowl, but was not good for preserving the breed as admixture was increased further and a 'pure' line was not kept. After more than three decades and 23 generations of backcross and inbreeding the four lines started to show nervous illnesses associated with consanguinity. After his death in 1974 these lines declined and were lost because of the difficulties of keeping them pure, and with this came an important reduction of the population of the fowl outside Mapuche communities. As a consequence of the work of Wilhelm the notion that the barred and black hens are the ones that lay the blue egg remained in the Chilean countryside, a fact that is observed quite often but not a *sine qua non* condition.

Origin

Albeit written historical records about the Mapuche fowl date since 1880, it is believed that this fowl has existed in Chile since ancient times. Linguistic evidence in the names for hen, *achawal*, rooster, *alka achawal*, and egg, *kuram* or *runtu*, which are different from those names used for animals that had arrived with the Spaniards such as *kawello* for horse (caballo), *waca* for cow (vaca) and *oweja* for sheep (oveja), suggest that as with the dog (*trewa*) and the pig (*sañwe*), the chicken was already present when the first Europeans arrived. Father José de Acosta (S.J.) in his book "Historia Natural y Moral de las Indias" (Natural and Moral History of the Indies), published in Seville in 1590, confirms these names for hen, rooster and egg, and indicates that chickens existed in America prior to the arrival of the Spanish and were quite abundant.

Until 2005 when Daniel Quiroz found the first Pre–Columbian chicken bones in the whole of the Americas, scientific evidence indicated that the chicken had arrived with Europeans (Crawford 1990). Predominance of traits from breeds of Asian origin in the Mapuche fowl as compared with those of Mediterranean origin which had arrived with the Spaniards, such as red earlobes, yellow shanks, small, rose, strawberry or pea combs, slow feathering and pigmented eggs), opened the possibility of arrival through trans–Pacific voyages (Errazuriz 2000, Menzies 2002).

A possible Chinese origin for the Mapuche fowl based on the presence of the oocyan blue egg trait in the Dongxiang and Lushi breeds (Zhao *et al.* 2006), has been dismissed as the two oocyan alleles have proved to be different (Wang *et al.* 2013, Wragg *et al.* 2013), as was explained above.

Instead, the hypothesis of Polynesian origin for people and chickens has gained support with linguistic similarities and common technologies for building canoes among Mapuche and Polynesian cultures (Storey *et al.* 2007), although the genetic evidence presented for mitochondrial DNA of Polynesian and American chicken bones has not been conclusive so far (Góngora *et al.* 2008). All in all, the bones found by Daniel Quiroz on the coast close to Punta Lavapié, south of the Arauco Peninsula, have been dated to the year 1364 ± 43 AD, and their carbon, nitrogen and sulfur natural isotopes suggest that the diet of those chickens was based on C3 plants, was mostly vegetarian and was terrestrial rather than marine (Storey *et al.* 2008). The latter is especially important for an adequate determination of the age of the bones as marine radiocarbon decays faster than terrestrial. These studies indicate that the chickens, associated with the El Vergel culture, were handled in captivity and raised rather far from the coast, so these bones may have been the remains of a picnic.

Conservation status of the Mapuche fowl

Some authors (Bustos 1922, Latcham 1922, Castelló 1924, Wilhelm 1966) consider that the Mapuche fowl has never been a pure breed, in the sense we consider pure breeds today (*i.e*. all individuals carrying the same traits and breeding them true to the next generation). As was explained earlier, ear tufts of the Mapuche fowl don't breed true so there will always be two or more types of chickens within the breed, and first descriptions by Rubén Bustos indicate high phenotypic diversity for plumage color, comb type, shank color, etc. Introgression with modern European and Asiatic breeds has occurred since their arrival early in the twentieth century and persists today with highly productive hybrid lines, as well as with ornamental breeds such as the Brahma and Cochin. A study by Gongora *et al.* (2008) showed high heterogeneity in maternal lines with eight haplotypes and three haplogroups present in modern day Mapuche fowl carrying the descriptive morphological traits (oocyan, ear tufts and/or rumplessness). Therefore, the question seems to be how to distinguish the original Mapuche fowl from old introgression that took place when the Mapuche kept their *colloncas* and *quetros* with other pre– and post–Columbian chickens, and also from more recent introgression derived from the crossing with modern European and Asiatic breeds as well as with modern day hybrids. This is a complex challenge awaiting genetic analysis tools yet to be developed.

The actual situation of the Mapuche fowl has improved substantially in the last decade thanks to diffusion by television documentaries and written articles in magazines covering the subject. Several initiatives to recover this fowl linked to agricultural schools and municipalities covering an ample area of the country have been very successful and secure a stock of specimens that carry the morphological traits of the breed. An association of breeders of this chicken in Pirque near Santiago, called Mapu Achawal, holds a breed contest every year since 2008 and awards prizes to the best specimens. The number of participants in this contest, and in other recent ones, has grown in recent years reflecting the great interest in this Chilean breed outside Mapuche communities. If the actual trend continues, the Mapuche fowl should be abundant again in Mapuche communities as well as in smallholdings and with fancier breeders. Recovery of *colloncas* and *quetros* with their natural rusticity and disease resistance, confer resilience to subsistence systems of peasant farmers under the pressure of climate change and the occurrence of natural disasters, and contribute to food security both within and outside the Mapuche world. Though modern chicken breeds can also be suitable as a source of eggs and meat for Mapuche communities, they are not suitable for religious ceremonies in which the spirits are beseeched for food security as a whole. Conservation of this fowl has the wider significance of being linked to recovery of ancestral memories and practices in Mapuche culture.

CONCLUDING REMARKS

Recovery of cultural significance that the Mapuche assign to their *colloncas* and *quetros*, which has been collected by the author and collaborators and presented here, is a good example of how recovery of biodiversity can revitalize cultural knowledge including religious practices, language conservation, cosmic vision and very importantly, Mapuche cultural pride. As proposed by Ibarra *et al.* (2012) for the condor, the Mapuche fowl may also be considered a biocultural keystone species which, as defined by Ellen (2006), are organisms which by virtue of their importance for human beings can become ecologically crucial for the maintenance of the livelihood of human environments.

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