

Project

TRIALS OF ZAMORANO-LEONESE DONKEYS TO PROTECT CATTLE

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1. Introduction

The presence of large carnivores such as wolves (*Canis lupus*) often leads to a clash of interests with livestock production when losses to predation occur. Preventive measures represent one of the best solutions to achieve coexistence by actively reducing damage to livestock. Among the options available, livestock guarding dogs (LGDs) are one of the most well-known (Linnell and Lescureux, 2015). While there is good evidence of their effectiveness against many predators, LGDs can cause problems such as conflicts with other land-users and often have high rates of premature death. Other guard animals, including donkeys, may represent a better alternative in some scenarios, but scientific studies of their efficacy are rare (see the review by Rigg in this issue).

The Spanish Zamorano-Leonese donkey is a large, strong, long-haired breed giving it a formidable appearance and the ability to withstand extreme weather conditions. These characteristics, together with the typical aversion of some donkeys to canids, might make the Zamorano-Leonese well-suited to the role of livestock guardian.

In 2014–2016, we implemented a pilot project in the province of Zamora, the main goals of which were: I) to assess the efficacy of the Zamorano-Leonese donkey in protecting livestock from wolves

and other canids; II) to improve coexistence between wolves and livestock in Zamora; and III) to promote this autochthonous breed by enhancing its value with a new use. Here, we report the main findings of the project.

2. The Zamorano-Leonese donkey

One of five breeds of donkey currently recognised in Spain (Yanes García, 2006), the Zamorano-Leonese originated in Zamora and neighbouring provinces of Castilla and Leon, NW Spain (Fig. 1). It is a large and powerful animal, up to 145 cm at the withers, with large muzzle and ears, long and strong limbs and large hooves. The coat is reddish-black with white tones on the snout, eyes, belly and upper part of the limbs (Fig. 2). The tail is long, as is the hair on the ears, forehead and cheeks, with typical strands of wool on the chest and belly. The breed has specific reproductive characteristics: long pregnancy (12 months), late age of first breeding (three years) and a long breeding interval (usually two years).

In the past, many households kept a couple of donkeys to accompany shepherds with their flocks or on short trips, to plough vineyards and transport water from wells to houses. The Zamorano-Leonese

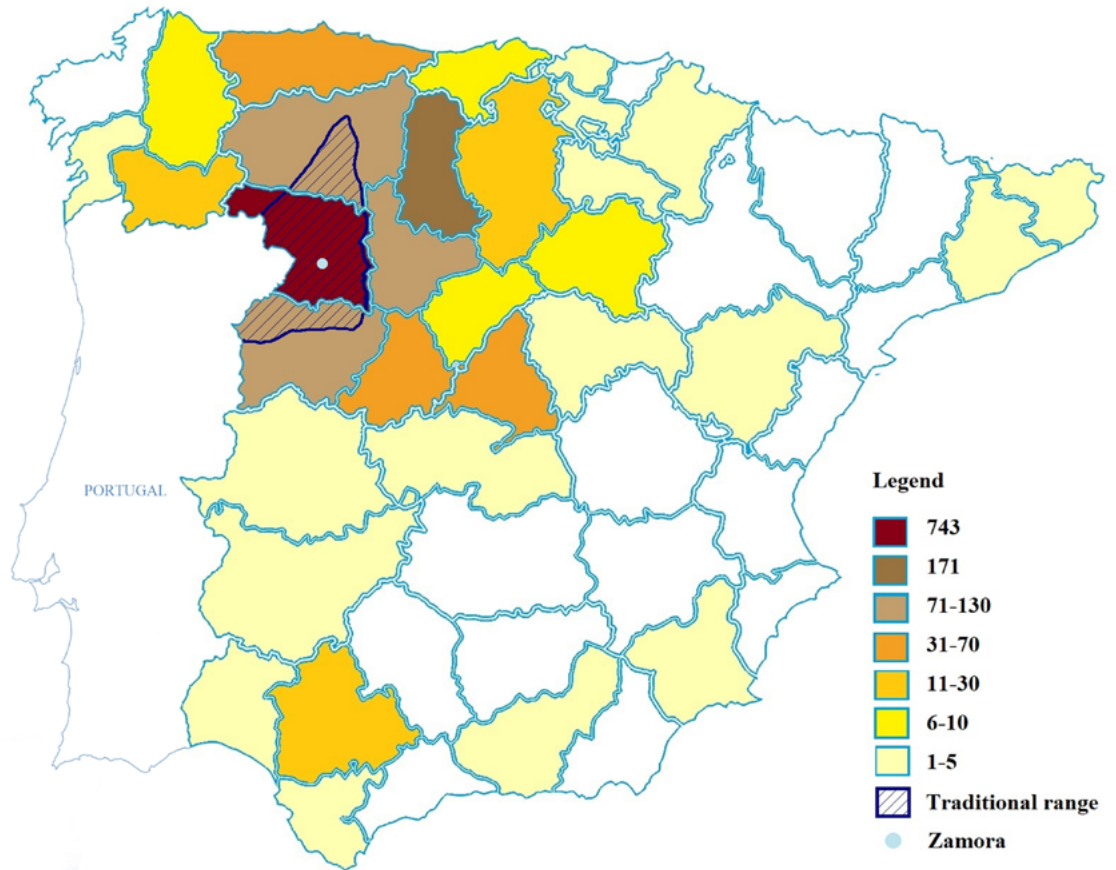


Fig. 1 Traditional and current distribution of the Zamorano-Leonese donkey, showing the number of donkeys per province according to a 2020 survey.

(Source: Spanish Ministry of Agriculture, Fisheries and Food)



Fig. 2 Male Zamorano-Leonese donkeys. (Photos: ASZAL)

increased in value after the 18th century when it was often crossed with horses to supply regional markets with mules, which acquired great importance as traction and transport animals. This practice fell out of use with the arrival of motor vehicles, resulting in the rapid regression of the breed to the heartlands of traditional breeding.

By 1987 the breed was considered ‘in danger of extinction’, a status maintained to this day. A breed association, the Asociación Nacional de Criadores de

la Raza Asnal Zamorano-Leonesa (ASZAL), was created in 1995 to ensure its purity, selection and promotion. In the same year, owners began to receive EU funds for the conservation of endangered livestock breeds. These days, not many people have the interest, space or means to keep Zamorano-Leonese donkeys. A 2020 census¹ recorded about 1,500 animals, mostly in Castilla and Leon, particularly Zamora (Fig. 2). Many of them are now ageing, like much of the farming community who still use them.

¹ <https://www.mapa.gob.es/es/ganaderia/temas/zootecnia/razas-ganaderas/razas/catalogo-razas/equino-asnal/zamorano-leones/iframe-ejemplo-arca.aspx>



Fig. 3 Two male mules were also included in the study. (Photo: Javier Talegón)

3. Methods

3.1 Selection and testing of donkeys

To select the most suitable animals for the project, available males² belonging to ASZAL and the first author of this article were subject to a test in which their reaction to a shepherd dog on a leash was assessed within and near their corrals. Due care was taken to avoid any harm to the dog. Twelve donkeys that showed the most aggressive reaction were selected: those that rushed at the dog and tried to attack it until it fled. They were all castrated males, from three to six years of age. Two 6-year old male mules, offspring of Zamorano-Leonese donkeys (Fig. 3), showed good reactions in the dog test so were also selected. Of these 14 animals, six were placed on farms and integrated into herds of cattle (see below).

3.2 Participating farms

Information provided by the Territorial Environment Service of the Junta de Castilla y León was used to select farms most affected by wolf and stray dog attacks. Locations of wolf packs in the province of Zamora in 2013 and 2014 were also obtained to

provide additional information on predation risk to inform the selection process. A total of 26 farms were identified and visited to explain the project goals and gather additional information about problems with predators.

Despite these efforts and widespread publicity of the project through local authorities, the media, social networks and a donkey fair in 2015, not much interest was generated among farmers. Their main doubts seemed to be concern about the extra work involved and a lack of belief about the usefulness of donkeys against wolves.

Four farms were included in the project, all south of the Duero River in Zamora province. Participating farmers signed a collaboration agreement with ASZAL in which they agreed to comply with protocols and guidelines set by the project, safeguard the welfare of the animals provided, alert ASZAL to any problems and provide all assistance and cooperation necessary for successful completion of the study.

3.3 Placement of donkeys on farms

Four donkeys and two mules were integrated into herds of cattle: Charolais x Limousin crossbreeds kept for meat or Lidias bred for fighting bulls (Fig. 4). In most cases, one donkey was placed at each farm, as multiple donkeys might stay together, away from other livestock (Green, 1989). An exception were the mules, which had been raised together and were previously in a herd of around 20 mules, so they were kept together and placed at a farm that had regular losses to canids. This was a relatively large farm with cattle separated into different lots of cows and calves, so a donkey was also placed at this farm in a second herd. In all cases, the number of cattle in each herd (adult and subadult cows) was limited to 20–50 head per guard animal (Table 1).

Table 1 Details of farms, livestock, pastures and guard animals.

Farm	Municipality	Cattle breed (production)	Guard animals	Head of cattle/ guard animal	Area of pasture (m ²)
#1	La Bóveda de Toro	Lidia (fighting bulls)	1 donkey	45	45,000
		Lidia (fighting bulls)	2 mules	20	17,000
#2	Guarrate	Charolais x Limousin (meat)	1 donkey	30	35,000
#3	El Maderal	Charolais x Limousin (meat)	1 donkey	35	15,000
#4	Fuentelapeña	Lidia (fighting bulls)	1 donkey	50	30,000

² Females were used for breeding and hence were unavailable.



Fig. 4 Donkeys were placed in herds of cattle: Charolais x Limousin crossbreeds kept for meat (left) or Lidiya bred for fighting bulls (right). (Photos: Javier Talegón)

3.4 Bonding donkeys with cattle

We followed guidelines and recommendations in the published literature (e.g. Bourne, 1994; Walton and Feild, 1989) and advice provided by experienced researchers. Guard animals must go through a process of socialisation with the stock they are to protect so that they become familiar with each other and will subsequently stay together in a cohesive group, a typical behaviour of social herbivores. According to the literature (e.g. Bourne, 1994; Green, 1989; OMAFRA, 2018), up to six weeks may be allowed for this, but 1–2 weeks are usually recommended.

In our study, donkeys and mules were kept in an enclosure adjacent to cattle for ten days, where they were able to see, hear and smell each other (Fig. 5). During this period, contact with farm and cattle dogs was avoided to prevent the donkeys becoming familiar with them, which might have diminished their instinctive aversion to canids.

After the initial bonding phase, donkeys and mules were released with cattle into pastures for the remainder of the study. Small or medium-sized fenced pastures were chosen, with open areas and good visibility, mostly with few or no trees (Fig. 6).



Fig. 5 Bonding donkeys with cattle. (Photos: Javier Talegón)



Fig. 6 After socialisation, donkeys guarded cattle in fenced pastures with open areas and good visibility. (Photos: Javier Talegón)

3.4 Monitoring and evaluation

Farms were visited weekly or fortnightly to ensure that the agreed husbandry guidelines were being followed and to monitor the adaptation, behaviour and welfare of donkeys and mules. Whenever a farmer was absent from the farm during such visits, the required information was obtained by telephone. The following data were also gathered for each farm: damages (number of animals killed, injured or disappeared) and the predator held responsible (dog, wolf or fox); changes in herd size; and any changes in the pastures that may have occurred. Official records (see section 3.2) of damage to livestock attributed to wolves and dogs during the 12 months preceding the trial were used to compare with the level of losses after placement of donkeys and mules.

4. Results

4.1 Placement and socialisation

All donkeys and mules were successfully integrated into cattle herds. Farmers generally followed the agreed protocols and guidelines, although there was a lack of compliance at two farms. During monitoring visits we observed that some animals were not always kept in the agreed pastures or with the specified number of cattle.

4.2 Behavioural problems

Two donkeys attacked new-born calves, leading to early termination of the trials at two farms (Table 2). One of them bit a calf and was immediately removed from the herd. The second donkey inflicted fatal injuries to three calves before it was removed. Another donkey protected cattle feed (*tacos*), preventing cattle from accessing it, and was thought to have injured one of the cows, which led to curtailment of the trial at a third farm (Fig. 7).



Fig. 7 We found that some donkeys may protect certain types of cattle feed (e.g. *tacos*), although apparently not hay. (Photo: Javier Talegón)

4.3 Before/after comparison of damage

Four donkeys and two mules were used to protect five cattle herds at four farms for a combined total of 11 months, during which no losses to predators were recorded in any of the herds. In contrast, a combined total of 18 head of cattle (1–8 per herd) had been lost to predation during the 12 months prior to guard animals being integrated into the herds at rates of 0.08–0.57 head per month per herd (Table 2).

5. Discussion and conclusions

Our pilot project shows that Zamorano-Leonese donkeys can be socialised with cattle. Except for some farmers not always following protocols and guidelines, there were no major difficulties with initial adaptation of donkeys or mules to herds, even of Lidias, which are usually relatively aggressive. However, several behavioural problems arose later which resulted in cattle being injured (some new-borns fatally), leading to permanent removal of some donkeys from herds, the premature end of those trials and an understandable lack of interest of the affected farmers to continue collaborating.

Table 2 Reported losses to predation (in total and per month) before and after guard donkeys/mules were placed in cattle herds and reasons for curtailing trials.

Farm	Guard animals/herd	No. of cattle killed (per month)		Trial duration	Reason for ending trial
		Before	After		
#1	1 donkey	8 (0.57)	0 (0)	3 months	Farmer no longer committed to the project
	2 mules	4 (0.33)	0 (0)	3 months	
#2	1 donkey	1 (0.08)	0 (0)	1 month	Donkey prevented cattle accessing feed, injured a cow
#3	1 donkey	2 (0.17)	0 (0)	1 month	Donkey injured a new-born calf
#4	1 donkey	3 (0.25)	0 (0)	3 months	Donkey killed new-born calves

These incidents may have been the result of over-protective behaviour as described in the literature (Bourne, 1994; OMAFRA, 2018). The unfamiliar odours, sounds and movements of new-born calves elicit strong responses in some donkeys which may try to expel them from the herd. To avoid such problems, special care should be taken during calving, when it may be necessary to separate donkeys from livestock. As an alternative, donkeys could be used with subadult cattle, which are more vulnerable to predation than adult cows.

One of the donkeys in our trial prevented cattle from accessing feed. We have not found mention of this in the literature, so it might be rare behaviour, but we suggest further investigation and due consideration of measures to prevent it.

The small number of farms (four) and guard animals (six) included in our study, and the short duration of trials (1–3 months each), limit the strength of conclusions that we can draw regarding the effectiveness of Zamorano–Leonese donkeys and mules to protect livestock from predators. Nevertheless, our findings suggest that they might be capable of protecting cattle from canids. This is supported by the statements of some other farmers in Zamora and neighbouring provinces who told us that, in their experience, Zamorano–Leonese donkeys can be

effective against foxes, stray dogs and single wolves. Therefore, we believe that they have potential to be a useful damage prevention measure, especially for small farms and where LGDs³ or other measures such as anti-predator fencing are unsuitable, too costly or require too much time or effort to deploy.

For Zamorano–Leonese donkeys to play a greater role in protecting livestock from predators, additional trials over longer periods and with larger numbers of animals are necessary in order to gather sufficient data for a more thorough assessment of their effectiveness. Research is also needed to identify best practices concerning selection, raising and use of guard donkeys and mules to prevent problems such as those encountered in our pilot project.

We think that donkeys could be a good first tool to deploy in areas of potential and recent wolf expansion, where wolf density is low, since they are easily integrated with livestock and can start protecting it within a few weeks. Despite the apparently low level of motivation to use guard donkeys in Zamora, we have seen increasing interest in neighbouring provinces such as Salamanca and in Ávila and Madrid, where the wolf is currently recolonising parts of its former range, which could bode well for the future of the Zamorano–Leonese breed.

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³ For a comparison of donkeys and LGDs, see the review by Rigg in this issue.