

**ACTIONS BY THE SPANISH SECTORAL FEDERATION OF WEAPONS AND AMMUNITION (FSA)
CONCERNING THE USE OF LEAD-BASED AMMUNITION IN THE TERRESTRIAL ENVIRONMENT**

Concern about the use of lead-based ammunition for hunting has been growing in recent decades, principally over the last four years. This concern has been the subject of several academic papers and reports published in recent years, especially the recent study published by the ECHA (European Chemicals Agency), which set out the need to adopt measures to regulate the use of lead-based ammunition in both wetlands and terrestrial environments.

Aware of the current situation and the growing alarm which has been caused, at times lacking any sort of scientific basis, the Spanish Sectoral Federation of Weapons and Ammunition decided to conduct a study entitled, at its authors' proposal, "INCIDENCE AND REPERCUSSION OF LEAD PELLETS INTRODUCED INTO THE TERRESTRIAL ENVIRONMENT ON TERRESTRIAL GAME BIRDS". Among other objectives, it aims to provide a response to the scientific vacuum that numerous scholars have reiterated in their papers regarding the need to obtain further details about the incidence of lead-based ammunition on birds other than birds of prey in the terrestrial environment (Walter, H.; Reese, K.P.; Mateo, R.; Ferrandis, P.; López Serrano, F.R.; Martínez-Haro, M.; Martínez-Duro, E.; Butler, D.A.; Sage, R.B.; Draycott, R.A.H.; Carroll, J.P.; Potts, D.; Tavernier, P.; Roels, S.; Baert, K.; Hermans, K.; Pasmans, F.; Chiers, K.; Bingham, R.J.; Larsen, R.T.; Bissonette, J.A.; Hall, J.O.; Kendall, R.J. and others).

In view of the aforementioned vacuum and the need set out in scientific publications, the Spanish Sectoral Federation of Weapons and Ammunition submitted a project to carry out activities in the areas of terrestrial biodiversity, marine and coastal biodiversity and the promotion of environmental information to the Biodiversity Foundation, which then depended on the Ministry of Agriculture, Fisheries, Food and the Environment, during three successive years (2016, 2017 and 2018) for the granting of funding within the framework of a competitive tender. Despite the fact that the project was a high technical assessment score, the Biodiversity Foundation decided not to include us among the eligible projects in any of those years, alleging it was not strategic, though it had received more than 30 letters of support from agencies like the Sub-Directorate General for Forestry of the MAPAMA (Ministry of Agriculture, Fisheries, Food and the Environment), the Sub-Directorate General for the Environment of the Castilla y León Regional Authority, the Government of the Canary Islands' Directorate-General for the Protection of Nature and the Hunting Resources Research Institute (CSIC-UCLM-JCCM), etc.

Though the study failed to obtain funding from the Biodiversity Foundation, it went ahead with its ambitious objectives:

- Sample a larger number of hunting species susceptible of ingesting lead pellets (as grit or due to mistaking said pellets for food).
- Take samples in a significant territorial scope under different variables, such as: time of sampling, type of sampling method, conditions of the space to be sampled (protection mechanisms associated to the territory), hunting intensity, etc.
- Analyse a large number of variables for each of the samples, such as: crop contents, gizzard contents, intestine contents, lead concentration in the liver and lead concentration in the kidney (only in case of any doubts).

These objectives were more than accomplished. Thus, a total of 530 samples from seven different game species were obtained from six different regional authorities (nine provinces). According to the number of samples, the sampling areas and the samples' study, the work performed is presently the most extensive conducted in Spain and one of the most significant at a European-wide level. If we compare the results based on the number of samples without delving into any further details which are especially relevant, the following can be observed:

Pellets found in **gizzards** that are "suspected" of having been ingested:

| Author(s) | Country | Species | Samples | Percentage |
|------------------------|----------------|--------------------------------|----------------|-------------------|
| Tabernier et al., 2004 | Belgium | Rock dove | 2 | 50.00% |
| Dement et al., 1987 | USA | Rock dove | 13 | 23.08% |
| Soler et al., 2004 | Spain | Red-legged partridge | 7 | 14.28% |
| Larsen et al., 2007 | USA | Chukar partridge | 75 | 10.67% |
| Richard et al., 2015 | USA | Chukar partridge | 461 | 9.33% |
| Walter et al., 2003 | USA | Chukar partridge | 123 | 5.69% |
| Imre, 1997 | Hungary | Common pheasant | 947 | 4.75% |
| Ferrandis et al., 2008 | Spain | Red-legged partridge | 76 | 3.95% |
| Butler et al., 2005 | United Kingdom | Common pheasant | 437 | 2.97% |
| FSA | Spain | Several | 504 | 2.78% |
| Potts, 2004 | United Kingdom | Partridge (Iberian subspecies) | 1318 | 1.74% |
| Clausen et al., 1979 | Denmark | Partridge (Iberian subspecies) | 62 | 1.61% |
| Butler, 2005 | United Kingdom | Red-legged partridge | 144 | 1.38% |
| Clausen et al., 1979 | Denmark | Common woodpigeon | 142 | 0.70% |
| Butler, 2005 | United Kingdom | Red-legged partridge | 637 | 0.16% |
| Watson, 2004 | USA | Chukar partridge | 77 | 0.00% |

As far as pellets found in the **crop** and **intestines** "suspected" of having been ingested are concerned, no scientific bibliography has been found that would allow us to assess said presence in order to be in a position to establish comparisons. The study found that there were suspicions in **1.19%** and **1.98%** respectively of the 504 samples processed (once the 26 farm specimens had been discarded from the 530 samples).

According to the scientific bibliography, the concentration of lead in tissues like the liver and kidney is the best indicator of possible poisoning as a result of lead ingestion. According to the Sectoral Federation of Weapon's study, the outcome of analysing the 530 samples was as follows:

- 3.8% of the specimens were "suspected" of having ingested lead pellets (threshold value of 0.65 ppm of wet weight)
- 3.0% of the specimens were "suspected" of having ingested lead pellets (threshold value of 1.5 ppm of wet weight)

The threshold value of 0.65 Ppm for hepatic lead concentration is the most conservative (not necessarily the one which is best adjusted to the populations' reality). To all the above, it should be added that the mean hepatic lead concentration in the game birds under study (n=530 / 0.064 ppm) was ten times lower than the threshold concentration for environmental exposure described (0.65 ppm).

The table below was obtained in an effort to establish a comparison with the scientific bibliography that was found, since in most cases it was not possible to gain access to individual data:

| Author(s) | Country | Species | Samples | Percentage > 0.65 ppm |
|----------------------|--------------|--------------------------------|------------|-----------------------|
| Dement et al., 1987 | USA | Rock dove | 5 | 80.00% |
| Soler et al., 2004 | Spain | Red-legged partridge | 7 | 28.57% |
| Richard et al., 2015 | USA | Chukar partridge | 121 | 9.92% |
| FSA | Spain | Several | 530 | 4.53% |
| Clausen et al., 1979 | Denmark | Partridge (Iberian subspecies) | 62 | 1.61% |
| Clausen et al., 1979 | Denmark | Common woodpigeon | 142 | 0.70% |
| Clausen et al., 1979 | Denmark | Common pheasant | 199 | 0.00% |

Once the study was completed, certain aspects were detected which should be considered in the future to avoid the situations we encountered that would oblige one to improve the sampling protocol:

First.- The method followed led to certain difficulties, though the same sampling protocol used in this study has almost always been followed throughout the scientific bibliography. Determining the presence of lead pellets in the crop, gizzard and intestine or lead concentrations in the tissues of different organs (liver and kidney) where the samples have been obtained from gunshots using lead-based ammunition seems to lead to doubts concerning the results' interpretation.

Second.- The percentages obtained for the presence of lead pellets "suspected" of having been ingested in the crop, gizzard and intestines are subject to possible errors. In the case of the crop and intestines, their fragility, exposure to gunshot impacts and

possible breakages resulting from the retriever dogs' actions place their use as a source of information into doubt when lead-based ammunition is used. As regards the gizzard, it is subject to possible errors like the introduction of a pellet into the gizzard's interior through the proventriculus as a consequence of the gunshot despite it being a much sturdier organ.

Third.- As far as tissue concentrations are concerned, there are doubts in some cases that make one reasonably think that some samples may have been contaminated by the study's own sampling method, which is furthermore congruent with the scientific bibliography.

Fourth.- A sampling (less specimens and localised) of target species (suggested in the report) with lead-free ammunition should not be discarded to determine possible contamination. In the case of the appearance of some samples having high lead values in the tissues, conducting an analysis of stable isotopes is of interest to differentiate between lead from ammunition and from natural sources or other kinds of contamination.

CONCLUSIONS:

According to the report, the percentages of the sample's population suspected of being affected by lead of the sample analysed are as follows:

| | |
|----------------------------------|--------|
| – Crops | 1.19 % |
| – Gizzards | 2.78 % |
| – Intestines | 1.98 % |
| – Liver concentration(> 1.5 ppm) | 3.21 % |

In view of the results, we are dealing here with percentages that could be described as very low and below the average that appears in the scientific bibliography consulted. In any event and despite these being very low percentages, the report makes one thing clear. It places into doubt the sampling method with lead pellets as a result of possible contamination or the results' alteration it might entail. It is evident that a report of these characteristics cannot do away with the sampling method, since this would place into question the report itself. Furthermore, the disparity in the results found in the scientific bibliography also raises suspicions about the suitability and real effect of lead-based ammunition in the natural environment (terrestrial environment).

We are absolutely convinced that the percentages found would have been much lower had the ammunition used in the sampling been lead-free ammunition. This would ultimately demonstrate two things:

- ✓ The use of lead-based ammunition to determine tissue contamination or contamination due to lead ingestion in a population of game birds is inappropriate. This affirmation would place into doubt much of the scientific bibliography, which has been deviously used to damage the industry. Among other aspects, its studies have been conducted on farm species and in intensive hunting reserves, scenarios which have nothing to do with reality and which emphasise negative elements, thus leading to flawed results.

- ✓ The percentage of the population suspected of being affected by lead is negligible. If lead-free ammunition were to be used (i.e. steel) and the same protocol was followed, we are convinced that the percentages set out above would be situated below 1%. This would suggest that the lead-based ammunition used to hunt for small game does not pose any risk whatsoever to the conservation of the species under study.

In spite of the fact that only a few specimens were suspected of having been affected or contaminated by lead, a very striking aspect of the report is that all the specimens (apart from one) were in outstanding physical condition. All were fully capable of defending themselves and were hunted or captured without any symptoms or suspicions being detected. Another aspect to take into account is that game bird species other than birds of prey are studied whenever lead contamination is investigated, despite the existence of a network of Wild Fauna Recovery Centres in Spain in which lead poisoning is not one of the main causes of death among birds of all kinds.

Under the preceding premises, it can be affirmed that the introduction of lead pellets into the terrestrial environment has very little (or in most cases no) incidence or repercussion on non-aquatic game birds.

Scientific uncertainty is dispelled by the study conducted by the Spanish Sectoral Federation of Weapons and Ammunition in keeping with the well-known Precautionary Principle adopted by a European Council Resolution in December 2000 in Nice, which states "In case of a threat to the environment and in a situation of scientific uncertainty, appropriate measures must be taken to prevent damage".

This study shows and clearly states the low level of existing risk resulting from the use of lead pellets and its repercussion on game birds, dispelling scientific uncertainty and thus the inconvenience of applying the Precautionary Principle.

In any event, if that were not enough, the policy stance which determines the level of protection sought and the need for the measures applied should, where possible, represent the least restrictive solutions for trade interactions, observe the principle of proportionality by taking into account short and long-term risks and, lastly, be re-examined on frequent basis in keeping with the evolution of scientific knowledge.

Hence, once the study has been conducted, the maximum level of risk (the percentages found were obtained under very conservative premises) can be determined, thereby doing away with uncertainty. It would therefore make no sense at all to apply said principle.