***Resumen del CV del IP***

Dr. Guillermo Blanco is a permanent researcher at CSIC since 2003, and at Museo Nacional de Ciencias Naturales (MNCN), belonging to the Consejo Superior de Investigaciones Científicas (CSIC) in Madrid. His research addresses aspects related to the biology, ecology, behaviour and conservation of wildlife from a functional and evolutionary perspective, using birds as study models. His work includes studies on sexual selection, reproductive strategies, parental care, feeding ecology, predation, host-pathogen interactions, genetic diversity, population structure, communication and signal expression, ecotoxicology and conservation biology. Among the key strengths of his research is the integrative and multidisciplinary approach he employs in his studies. The combination of different disciplines to examine

the same problem offers a continuous source of knowledge, brought about by the infinite interconnection of factors in natural systems and living organisms. From a practical point of view, such strategy may consequently help to open new lines of investigation and, it has served him to contribute to the advancement of the theory and hypotheses of classical population ecology with more specific ones in the fields of parasitology, immunology, physiology, toxicology and microbiology. Furthermore, his activity has sought to focus on populations of threatened species in an effort to contribute to their conservation. Over the course of his scientific trajectory, Dr G. Blanco has consistently obtained funding for research projects in highly competitive calls from public entities. Until now, he has led a total of 8 projects as principal investigator, and participated in 4 others. In addition, he has been involved in 9 R&D contracts and agreements with both private bodies and public agencies, being the principal investigator in 9 of them. The excellence in the quality of his research work is reflected in his vast scientific output: he has published a total of 207 articles in SCI listed journals (120 as first or last author, plus another 23 publications in non-SCI journals), with a total of 7603 citations and an h-index of 5’, according to Google Scholar. 150 of these publications are found in journals within the top 25% of their field, as based on ISI-JCR impact factors. Of special relevance is his article entitled Raptor nest decorations are a reliable threat against conspecifics, published in Science (2011), and his article Network structure embracing mutualism antagonism continuums increases community robustness published in Nature Ecology and Evolution (2017). In addition, he has published one book,written 16 book chapters, and presented work at 51 congresses, both national and international. Finally, Dr G. Blanco has proven to possess ample expertise in training researchers: he has supervised 2 post-doctoral researchers, directed four PhD theses, four bachelor students, and 3 MSc student in the past. Currently, he is directing four Ph D students.

***Previous results of the team in the theme of the proposal***

For more than three decades, Guillermo Blanco (GB) from the MNCN, has been studying corvids in collaboration with José L. Tella (JLT) from EBD, in order to know in detail its requirements and long-term trends, having so far published 36 articles on these species in indexed journals. Previous studies on have resulted in knowledge on breeding ecology (Tella et al., 1994; Blanco et al., 1997a,1998b), trophic ecology (Blanco et al. 1994, Sánchez et al.,1996), social organisation and roosts (Blanco and Tella; 1997; 1999), predation (Tella and Blanco 1993; Blanco and Tella, 1997, Banda and Blanco 2009, 2017), arthropod symbionts and haematozoa (Blanco et al., 1997b,c). During 2010 and 2019, GB coordinated the third and fourth International Congress on the ecology and conservation of the choughs, held on the island of La Palma and the city of Segovia, respectively. Recently, GB have coordinated the first transnational census of the population of jackdaws in Iberia (España and Portugal), whose results will be published in a monography in 2023 (Blanco and Garcia, Eds, in preparation).

***References by the research team related with project***

**Banda, E., Blanco, G. 2008.** Influence of hatching asynchrony and within-brood parental investment on size, condition, and immunocompetence in nestling red-billed choughs. Biol J. Linnean Soc. 94:675-684. **Banda, E., Blanco, G. 2009**. Implications of nest-site limitation on density-dependent nest predation at variable spatial scales in a cavity-nesting bird. Oikos 118:991-1000. **Banda, E. and Blanco, G. 2017**. Does nest placement in buildings influence nest predation in red-billed choughs?. Ethol. Ecol.Evol. 29:436-448. **Blanco, et al. 1991**. La población de Chova Piquirroja *Pyrrhocorax pyrrhocorax* en el Sureste de Madrid (Centro de España). Ardeola 38:91-99. **Blanco et al. 1993**. Seasonal variations in numbers and levels of activity in a communal roost of Choughs *Pyrrhocorax pyrrhocorax* in Central Spain. Avocetta 17:41-44. **Blanco et al. 1994.** Consumption rates of olives by choughs in central Spain: variations and importance. J. Field Ornith.65:482-489. **Blanco et al. 1996**. Age and Sex Determination of Monomorphic Non-Breeding Choughs: A Long-Term Study. J. Field Ornith. 428-433. **Blanco, G., Tella, J. L. 1997.** Protective association and breeding advantages of choughs nesting in lesser kestrel colonies. Animal Behav. 54:335-342. **Blanco et al. 1997a**. Role of buildings as nest-sites in the range expansion and conservation of choughs *Pyrrhocorax pyrrhocorax* in Spain. Biol Cons 79:117-122. **Blanco et al. 1997b**. Feather mites on group-living red-billed choughs: a non-parasitic interaction?. J. Avian Biol. 197-206. **Blanco et al. 1997c.** Hematozoa in two populations of the threatened Red-billed Chough in Spain. J. Wildl. Dis. 33:642-645. **Blanco et al. 1998a*.*** Effects of nest-site availability and distribution on density dependent clutch size and laying date in the Chough *Pyrrhocorax pyrrhocorax*. Ibis 140:252-256. **Blanco et al. 1998b**. Traditional farming and key foraging habitats for chough *Pyrrhocorax pyrrhocorax* conservation in a Spanish pseudosteppe landscape. J Appl Ecol 35:232-239. **Blanco et al. 1998c**. Breeding density and distribution of Choughs *Pyrrhocorax pyrrhocorax* nesting in river cliffs: the role of nest-site availability. Ardea 86:237-244. **Blanco G, Tella JL. 1999**. Temporal, spatial and social segregation of red-billed choughs between two types of communal roost: a role for mating and territory acquisition. Anim Behav 57:1219-1227. **Blanco, G. 2002.** Chova Piquirroja (*Pyrrhocorax pyrrhocorax*). Atlas de las Aves Invernantes de la Comunidad de Madrid (1999-2001): 280-281. SEO-Monticola. **Blanco et al. 2014a.** Commonness of not-so-common birds: the need for baseline knowledge of actual population size for the validation of population size predictions. Bird Study 61:351-360. **Blanco et al. 2014b.** Linking environmental stress, feeding-shifts and the ‘island syndrome’: a nutritional challenge hypothesis. Population Ecology 56, 203-216. **Blanco et al. 2019.** A shot in the dark: Sport hunting of declining corvids promotes the inadvertent shooting of threatened red-billed choughs. J. Nature Conser.52:125739. **Blanco et al. 2021**. Night Capture of Roosting Cave Birds by Neanderthals: An Actualistic Approach. Front. Ecol. Evol., 583. **Blanco et al. 2022**. The decline of common birds exemplified by the Western Jackdaw warns on strong environmental degradation. Conservation 2: 80–96. **Cuevas, J. A., Blanco, G. 2009.** Chova piquirroja – *Pyrrhocorax pyrrhocorax*. En: Enciclopedia Virtual de los Vertebrados Españoles. Salvador, A., Bautista, L. M. (Eds.). Museo Nacional de Ciencias Naturales, Madrid. **De Sanctis et al. 2013.** Evaluating contamination in the Red-billed Chough *Pyrrhocorax pyrrhocorax* through non-invasive sampling. Microch. J.107:70-75. **Morinha et al. 2017**.Extreme genetic structure in a social bird species despite high dispersal capacity. Mol. Ecol. 26: 2812-2825. **Sánchez-Alonso et al. 1996.** An analysis of the diet of Red-billed Chough *Pyrrhocorax pyrrhocorax* nestlings in NE Spain, using neck ligatures. Ornis Fennica 73:179-185.. **Tella, J. L., Blanco, G. 1993**. Possible predation by Little Owl *Athene noctua* on nestling Choughs *Pyrrhocorax pyrrhocorax*. Butlletin del GCA 10: 55-57. **Tella, J.L., Torre, I. 1993**. Sexual size dimorphism and determination of sex in the Chough (*Pyrrhocorax pyrrhocorax*). J. Ornith. 134:187-190. **Tella et al. 1994.** Egg size variability between clutches of Choughs (*Pyrrhocorax pyrrhocorax*). Avocetta 18: 69-72. **van Overveld et al. 2021.** Vultures as an overlooked model in cognitive ecology. Animal Cognition 1-13. **Villanúa et al. 2022.** Nesting associations and breeding output of Barn Owls *Tyto alba* and Red-billed Choughs *Pyrrhocorax pyrrhocorax* sharing nest boxes. Bird Study 69:3-4, 90-96.

***Human, material and equipment resources available for the execution of the Project***

**Background of the research group**

The research group is formed by two researchers of the CSIC (MNCN and EBD) with a long-standing history of national and international collaborations who had been working together for decades. Besides their scientific qualification, the research group is highly suitable to achieve the specific goals of the current project as their members have been previously participating or leading projects to study the effects of changes in limiting factors and the incidence of environmental alterations on bird populations (e.g. CGL2006-10689, CGL2009-12753-C02-02, CGL2009-12753-C02-01/BOS, CGL2010-15726). Therefore, this proposal can be considered as a continuation of their fruitful research line initiated years ago (see list of publications below and our CV for a complete list of related publications) and financed in previous projects, where they will combine traditional approaches with novel elements to advance in the comprehension of the interplay between human-activities and wildlife conservation. Importantly, the temporal window covered in this proposal (see below the information already obtained by the research team relevant for the present project during the last 30 years) is a key point to understand the consequences of different stressors on the population dynamics of long-lived species, something that it is extremely difficult to find and that represents the main advance of this project over previous ones. Thus, the project will allow proposing new frameworks for the management of bird species of agricultural habitats under the current scenario of global change.

***Training program planned in the context of the requested project***

We plan to conduct a PhD in ecology and conservation of common and rare bird species, with a particular focus in the long-term impact of environmental changes on behavioural and social plasticity, and its influence in conservation management. The huge amount of information on population trends, nesting habits, foraging conditions and demographic parameters previously collected, together experience of the members of the team in supervising students and the collaboration with multiple researchers ensure a high-quality formation for the student. This student, in turn, will maximize the generation and dissemination of results, through scientific publications and congress assistances. The training program planned for the student includes the specific doctoral programs of the Universities located in Madrid or Sevilla (e.g. Programa de Doctorado en Medio Ambiente y Sociedad from University Pablo de Olavide), the assistance of the student to weekly conferences performed at the MNCN and EBD, monthly group meetings to update the work and promote brainstorming, and several specialization courses and short stays at laboratories collaborating in the project. Specifically, the student will perform temporary visits to the University of Murcia (under the supervision of Dr. A.J. García-Fernández) to learn laboratory techniques relevant for the project. The student will take advantage of the large scientific and teaching experience of the members of the team. Both institutes involved in the proposal are top leaders in ecology and evolutionary biology, with facilities fully equipped for training doctoral students in a rich academic and scientific environment. The PhD contract will be offered at national and EU scales through the web pages of different universities.