LIFE med CLIFFS

Towards an integrative management of Invasive Alien Plant Species in Mediterranean sea cliffs of European interest

LIFE20 NAT/ES/001223

Survey on landscape perception as ecosystem service in relation to IAPS

BASELINE SITUATION

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Authors

Roi Rodríguez, Roser Melero, Sònia Garcia (IBB-CSIC)

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Executive summary

The present document reports on the results of the on-field and online surveys to the public in order to assess the baseline situation on the landscape perception as ecosystem service and its relation to the presence of invasive alien plant species.

Disclaimer

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1. Introduction

1.1. Context

The survey is aimed at evaluating the people's perception of the landscape as an ecosystem service and its relation to the presence of invasive alien plant species (IAPS).

In the project's context, we understand as "ecosystem" the areas close to the seaside, including cliffs and "camins de ronda" (walking paths next to the seaside). This "ecosystem" is consistent with the habitat of community interest 1240, which is the main object of the project. The main goal of the survey is detecting how the respondents value the surrounding landscape, which are the elements that add significant value, and which are the most valuable features (i.e. services) provided by it (e.g. aesthetic value, leisure, contact with nature, improvement of physical/mental health, etc.). Another important goal of the survey is to evaluate the knowledge level by the general public about the problem of invasive species.

2. Materials and methods

2.1. Survey design

This survey has two main sections: one with several questions about landscape perception and (invasive) plant literacy and another one which asks for demographic traits for sample description. In the first section there are questions about the landscape perception of the respondents (how much they value it, which are their most precious elements, which personal services do they recognise, etc.) and about the ability to identify six plants that are widely present among the Costa Brava and to recognise them as autochthonous or allochthonous, their effect over the landscape and if people considerer them as invasives; this section invites the respondents to give their perception about the problems that invasive plants can cause and the current management they receive. The second section collects data such as municipality of residence, gender, age, education level, occupation, etc, in order to provide an accurate demographic picture of the sample analysed. Several questions designed to detect biased perceptions/knowledge that may impact the results of the survey are also included at the end of the survey (e.g., if they take part of academia).

2.2. Survey conduction

The survey was carried out both on-field and online from April 30th to July 27th. On-field surveys were supported on Google Forms to ease data collection, they took an interview format and were carried out in different locations across the Costa Brava (Palamós, Sant Pere de Rodes, Cap Roig Botanical Garden, S'Aragó and Llançà). Tablets were used to conduct the on-field surveys. The online format was a copy of the same Google Form model, which was widely distributed through the project members and collaborators for an enhanced diffusion.

3. Results

3.1. General overview

We obtained 328 useful responses from an overall of 362 entries (individual surveys). The main source of data has been the online version with 232 useful responses in contrast to 96 on field ones.

By gender, there were 197 women respondents (60.06 %), 126 men (38.41 %), a person who self-defined as queer and 4 people who didn't answer this field. By age, the largest group of the respondents were in the range of 31-60 years old (201 people, the 61.28 %) followed by the 61-80 range (67 people, the 20.43 %) and fewer numbers of in the other ranges (34 people for 18-30, 24 in 0-18 and just 2 people older than 80 years).

Regarding educational level, the vast majority of the respondents had university studies (217 people as the 66.15 %). Fewer numbers of people had compulsory secondary school (32 respondents), high school/superior training education (35 people) or medium training education (27 people). Other minor numbers of lower study levels were present (most of them corresponding to the 25 school and high school students surveyed in a specific visit to a high school).

The educational profiles were reflected on the type of the employments, with 240 respondents (72.26 %) working on the tertiary sector, 99 of which in ecology, biology, agriculture or nature management; 28 teachers, 21 people working at the tourism and leisure industry, and 19 healthcare workers. As mentioned earlier, 25 people were students and in 32 cases the employment was not disclosed. The rest of the people represent a variety of jobs but in quite low frequencies.

Most of the respondents belonged the province of Girona, with 220 people corresponding to the 67.07 % of the sample, and the Barcelona province, with 103 respondents corresponding to the 31.40 %; only 5 people were from other locations.

3.2. Landscape evaluation

From the first group of questions, about the subjective landscape evaluation, we could already see that the general perception of this landscape is very favourable.

In question 1, ***How do you value this landscape?*** (Figure 1) 208 respondents valued it as *very good (molt bé)* and 109 as just *good (bé)*. Only 9 people considered it as *bad (malament)*, and no one valued it as very bad *(molt malament)*.

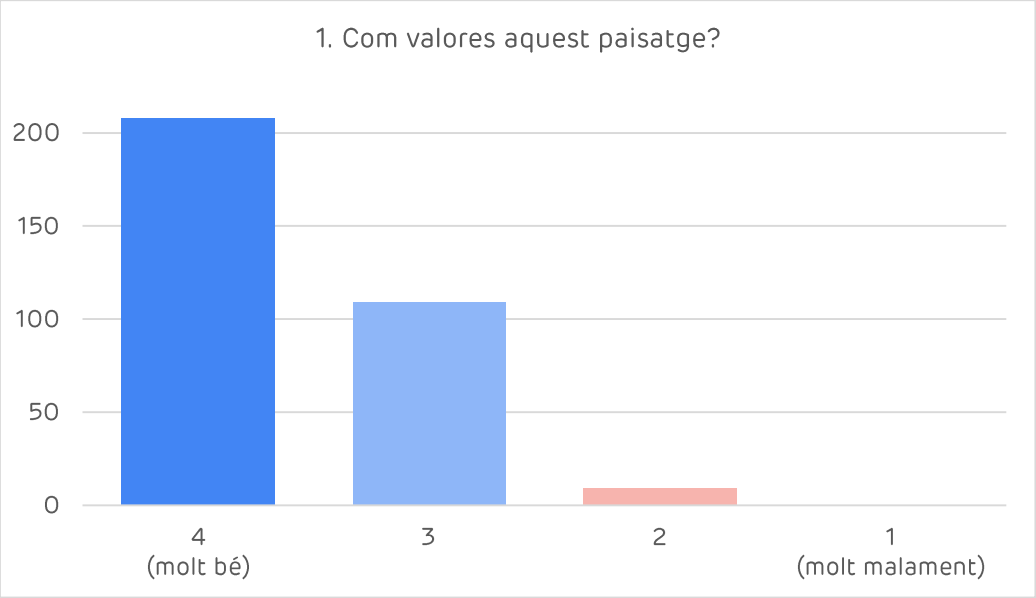

Figure 1. Results of question 1: How do you value this landscape? Scale of four levels from 1 (very bad) to 4 (very good).

In question 2: ***Which landscape elements are valuable?*** (up to three answers were allowed in a multiple response question), the most appreciated landscape element was the *sea (mar)* (292 answers), followed by the *vegetation (vegetació)* (274), then by the *land forms (les formes del relleu)* (238); the rest of the elements were clearly lower valued, as shown in Figure 2. In question 3: ***What does this landscape offer to you?*** (up to three answers were allowed in a multiple response question), the most selected options were *contact with nature (contacte amb la natura)* (278 votes) and *improvement of the mental health (millora de la salut mental)* (248), as shown in Figure 3.

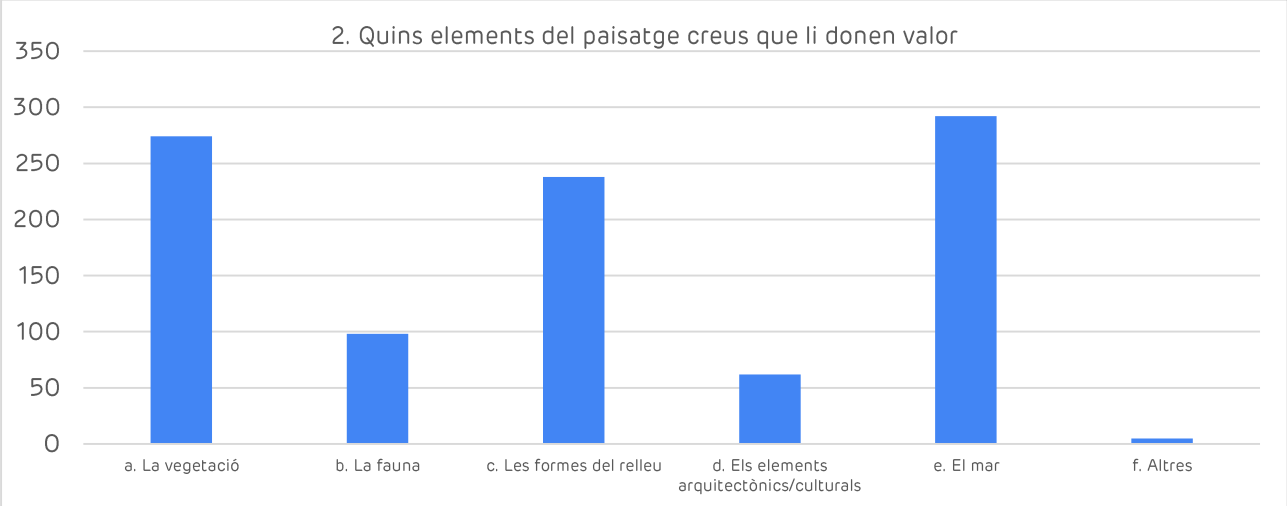

Figure 2. Results of question 2: Which landscape elements are valuable?

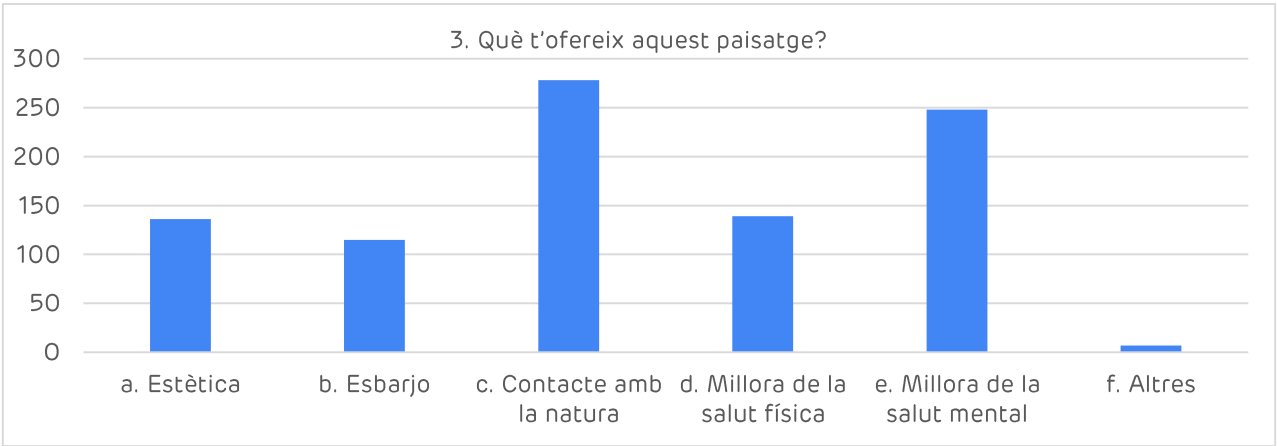

Figure 3. Results of question 3: What does this landscape offer to you?

Questions 4 and 5 had associated a set of four landscape pictures (Figure 4), presenting a progressive concentration of invasive plants. In fact, we noticed that the first two presented bigger areas of the image with larger depth of field in contrast to the other two, with more first term elements. However, we think that this bias is compensated by selecting the first two pictures with easy-to-identify plants and emblematic places for the other two.

Figure 4. From left to right and from up to down. Options 1, 2, 3 and 4 for questions 4 and 5.

In question 4: *Which picture do you consider as the most representative for this landscape?* (single option question), most people recognised the first two as the most representative ones (Figure 5A). The opposite situation happened with next question (5): *Do you see any invasive plant in any of these images?* (multiple response question) (Figure 5B).

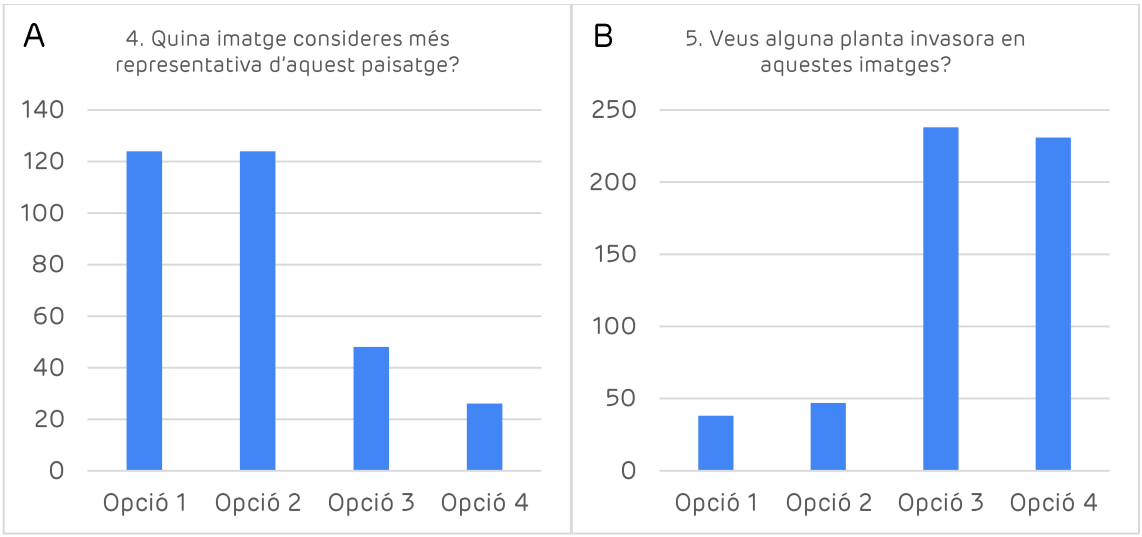

Figure 5. Results of question 4 (A) (Which picture do you consider as the most representative for this landscape?) and question 5 (B) (Do you see any invasive plant in any of these images?)

3.3. Plant identification

The next questions were, in fact, a set of questions about the ability to recognise six individual plants (Figure 6). People were asked to identify each plant by their image, giving a name if they knew it (popular or scientific), to determine if they knew the plant to be autochthonous or allochthonous, to assess their positive/negative effect in the landscape and if they knew whether the plant was invasive or not. This could be considered as the main focus of the survey, with the most interesting results (Figures 7 to 10).

In a nutshell, people clearly recognise *Pinus*, *Quercus*, *Opuntia* and *Carpobrotus*, giving their common names. Most people are also aware of their autochthonous or invasive nature within the Costa Brava. However, most people fail to recognise *Gazania* and *Limonium* and their role in this habitat.

Figure 6. Plants to identify by the respondents

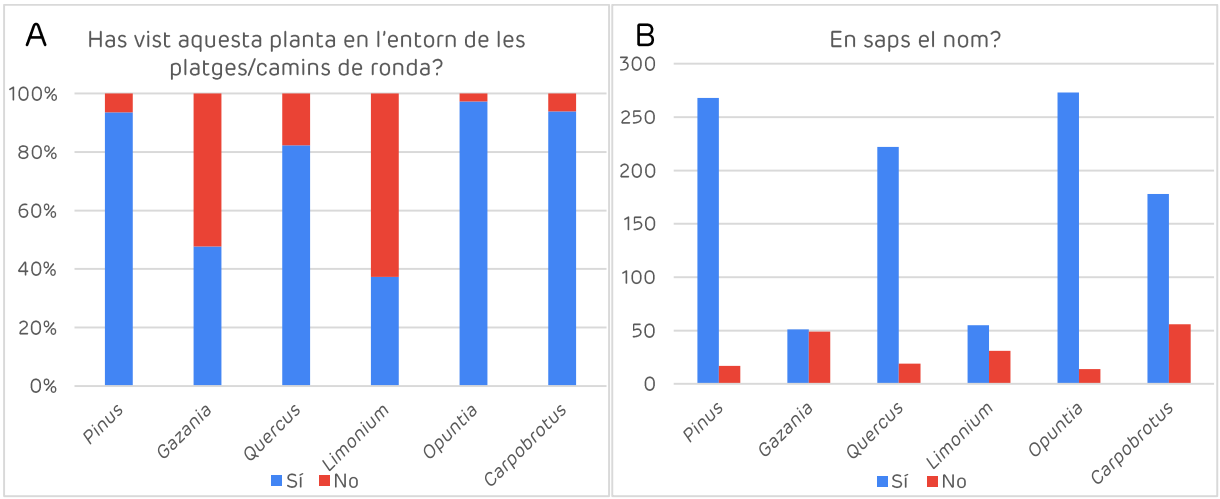

Figure 7. Results of questions: Have you seen any of these plants in the surroundings of beaches or paths? and: Do you know the name?

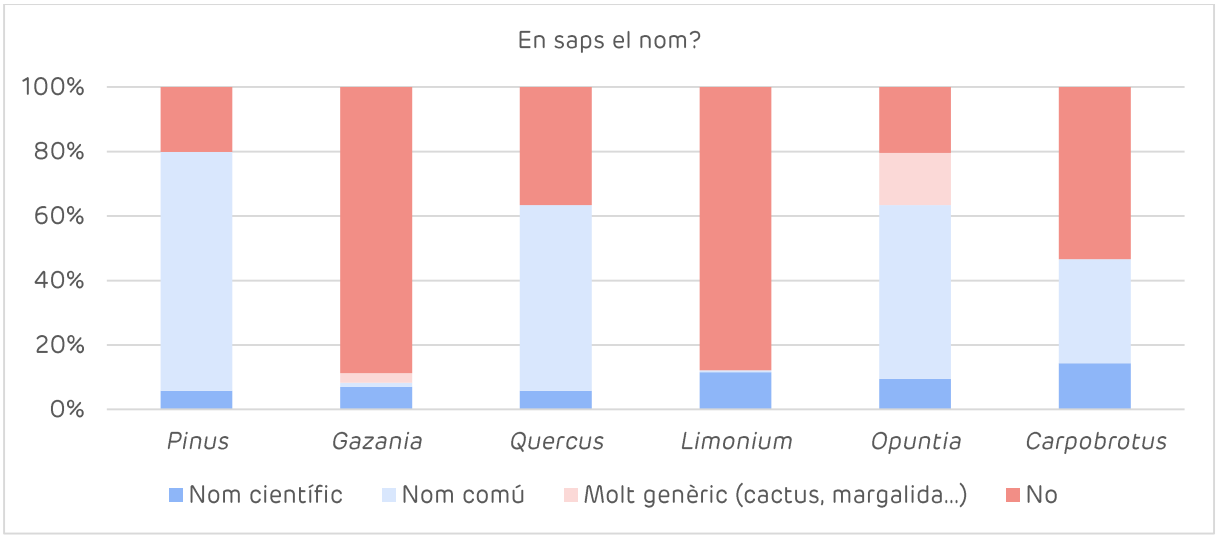

Figure 8. Results of question: Which name?

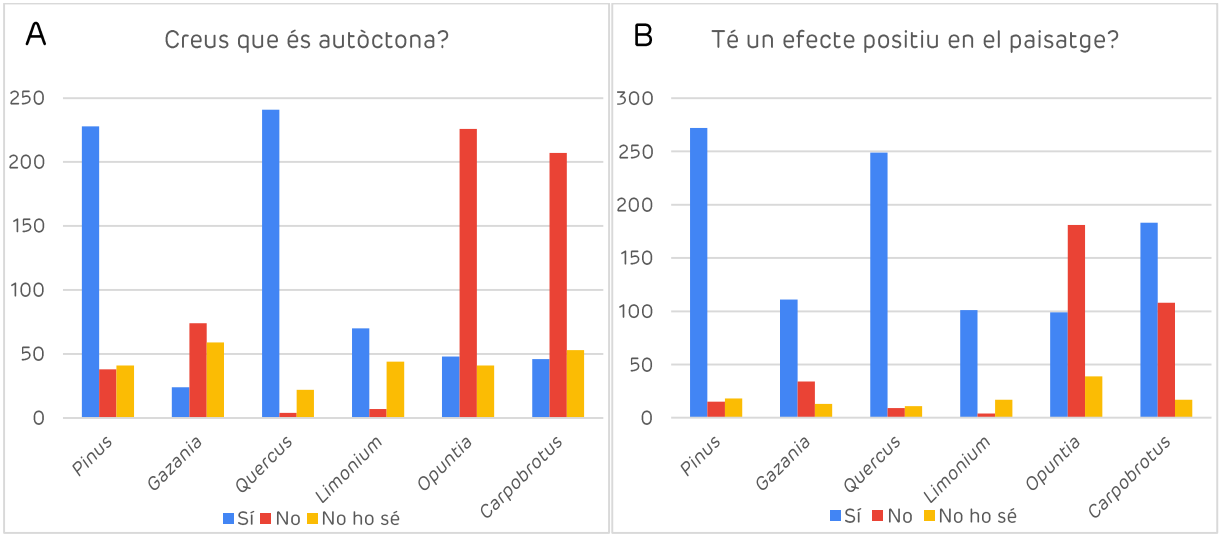

Figure 9. Results of questions: Do you think it is autochthonous? (A) and Do you think it has a positive effect in the landscape? (B)

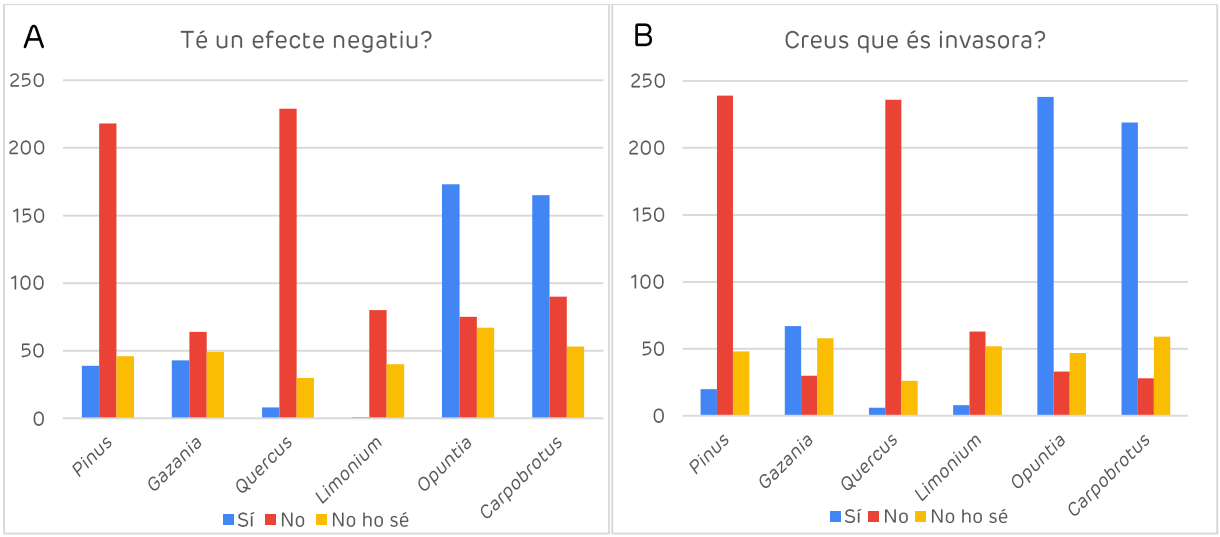

Figure 10. Results of the questions: Do you think it has a negative effect? (A) and Do you think it is an invasive species? (B)

3.4. Invasive plants environmental effects

In question 7. *Indicate if invasive plants represent a problem in the following aspects* (single response question) (Figure 11), we can see how most respondents (293 people) identify invasive plants as problematic for the natural environment, in contrast to only 11 that do not. When asked about their effect over the landscape aesthetics, those numbers get quite equal (159 and 128 respectively) and they reverse when asking for the problems to use the space (with 121 people seeing them as problematic and 166 that do not).

For the last question *Do you think that invasive plants are managed?* (single response question), 174 respondents pointed that they think that invasives are not properly managed, 83 think that they are not even managed, 48 do not know and only 16 people think that they are effectively managed. Interestingly, 6 people thought that invasives are managed in excess.

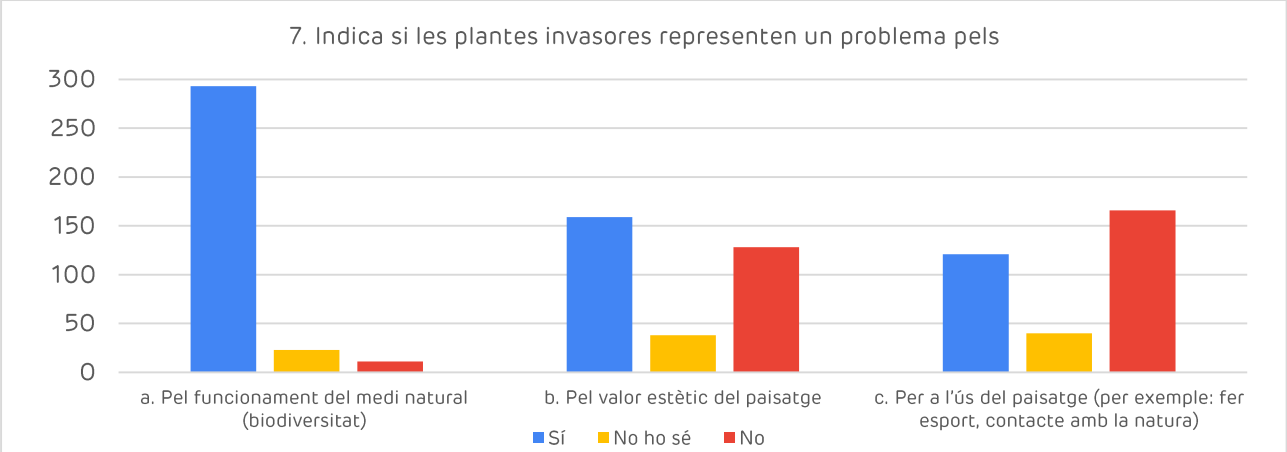

Figure 11. Results of the question: indicate if invasive plants represent a problem in the following aspects (a, biodiversity; b, aesthetic value of the landscape; c, use of the landscape)

4. Discussion and conclusions

In summary, we have observed a high appreciation for the landscape of the Costa Brava among our sample. Respondents also recognise which landscapes represent this habitat the most, and generally, they are able to recognise the presence of invasive plants. Interestingly, "vegetation" was the second most appreciated feature of this landscape, only after the sea. Thus, there is a clear appreciation for plants and their contribution to the beauty of the Mediterranean coast landscape.

Regarding to the ability to recognise plants, most of our respondents correctly identify *Pinus* and *Quercus*, referring to them by their popular names; they also recognise their positive effect on the landscape. Most respondents could also sort them as autochthonous, non-invasive-plants. People also recognised well both *Opuntia* and *Carpobrotus*, and most of them correctly identified them as invasive species too. Despite recognising their invasive nature, however, some people found both species as characteristic, and even typical of the Mediterranean coasts landscape, with a positive effect (many people highlighted the beauty of *Carpobrotus* flowers, for example). Yet most people were also aware of their potential damaging effects to the biodiversity. With regards to the general knowledge about the management of the invasive plant species, most people consider that they are poorly managed.

In contrast, few people recognised both *Gazania* and *Limonium*. This was, however, somehow expected. On the one hand, *Gazania* is an ornamental species of relatively restricted and recent distribution (much

less, and much more recent, than for example *Carpobrotus* or *Opuntia*), and the invasive behaviour is only visible in restricted areas of the PNCC, but it is not widely distributed in the Costa Brava as a whole. On the other hand, the *Limonium* species is a narrow endemism, besides, its tiny flowers may not have helped to recognise it easily. The fact that it is a restricted endemism may explain why most people do not recognise it at all, but among those who do, respondents could give the scientific name (mainly people with a profession related with ecology, biology, agriculture or nature management and possibly from the academic sector).

The response profile did not change significantly among population segments. Neither age, gender, educational level nor profession produced significant differences in the answers' profiles. There were not either significant differences among those surveyed on-field or online.

While conducting the surveys, we detected a general problem in understanding the concept of invasive plant species. People pointing a plant as autochthonous as well as invasive or indicating positive effects of the invasives are common (the latter is subject to debate among the academic community, where some scientists do stress certain positive aspects of invasives in certain conditions or environments). We also received comments reflecting some problems in defining what an invasive plant is, even from people working on ecology, biology, or related fields.

These results are very useful to define the future LIFE medCLIFFS communication, which should be focused in overcoming the misunderstandings and lack of knowledge about plants that we have detected.