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The Quito: Business development of an innovative domestic mosquito control solution

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Trabajo de Fin de Grado

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Business administration and management

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1. Acknowledgements

During this project, several people have contributed in different ways to make it possible, and I would like to give them a space to recognise the effort and trust they have put into my project.

First of all, I would like to thank my director, Rudi Loosens, for guiding and supporting me throughout my TFG. His advice was a great help to me, and he was always available to give very valuable insights. His trust and excitement for this project have been crucial for its successful development.

I would also like to thank the experts I interviewed, such as Tomàs Montalvo, Josep Parnau and Jose Ferreira, for giving me their time and sharing their knowledge and experience with me. This made my work increase in quality and provided me with so much expertise to fully comprehend this fascinating sector.

I would also like to thank my parents for believing in me and supporting me at all times. My father, who is not only a successful entrepreneur but also a great mentor, has inspired the existence of this project. My mother and her supportive and clever way of being have sustained me through the process. Their trust and patience were essential to me throughout my degree, and especially during the final degree project. Without their help, it would have been much more difficult.

Finally, it is essential to thank my friends for always being there for me. Every step in life is better when it is shared, and they can make me enjoy every one of those steps that shape life.

2. Executive summary

The Quito is an innovation in the pest control sector, launched by the family-owned company Wise Control Pest, based in Santa Perpètua de Mogoda (Barcelona). Its main goal is to introduce an innovative solution for household mosquito control.

This project arises from a market inefficiency: current solutions fail to combine effectiveness, safety, sustainability and a design that fits a home. The fact that the current market does not offer an attractive and complete solution is one of the reasons why mosquitoes remain one of the least controlled pests in domestic environments. Even though this existing gap in the market, demand for new solutions is increasing due to the spread of the tiger mosquitoes and the common mosquitoes. Currently, the tiger mosquito is present in 1,768 Spanish municipalities, occupying 21,5% of the national territory and affecting 66,2% of the Spanish population. This issue is currently a growing challenge for public health and domestic well-being.

To face this mismatch The Quito has been developed: an innovative domestic trap that reduces the presence of mosquitoes using a mechanical and non-toxic system. As a clear differentiation from traditional traps, The Quito uses an attraction system that uses an essence that emulates the human skin, a water deposit that attracts pregnant female mosquitoes and a mechanical capture method in which the mosquitoes are drawn into the trap. All these features and a clean way of mosquito control are integrated into a decorative vase that can fit aesthetically into any home.

2.1. Business model canvas

Moving into the business model, it has two revenue streams: the sale of the device and the periodic sale of the attractants. Moreover, through the purchase of the product, the customer will have access to an App that will have very unique features to complete the experience, such as reminders to replace the attractant, preventive tips and education (with the collaboration of official research institutions), personalisation options for the device and even a home simulator to optimise its use.

To picture the key stakeholders regarding this project, we have used the Business Model Canvas framework.

Table 1

The Quito Business Model Canvas

<table>
<tr>
<td rowspan="2">KEY PARTNERS

• Suppliers of plastic materials and attractants
• App developers
• Wise Control Pest technical team
• Health/public institutions
• Distributors & e-commerce platforms
• Mosquito prevention experts</td>
<td>KEY ACTIVITIES

• Product manufacturing
• R&D of attractants
• Marketing campaigns
• Distribution logistics
• Customer support
• App maintenance</td>
<td rowspan="2">VALUE PROPOSITIONS

• Non-toxic mosquito control
• Safe for children & pets
• Decorative design
• Easy maintenance
• Sustainable product
• Captures mosquitoes instead of repelling them
• Educational prevention support via app</td>
<td>CUSTOMER RELATIONSHIPS

• Personalized assistance
• After-sales service
• App notifications
• Online customer support
• Community education</td>
<td rowspan="2">CUSTOMER SEGMENTS

• Households
• Families with children
• Young couples
• Pet owners
• Hotels
• Restaurants
• Hospitals
• Schools</td>
</tr>
<tr>
<td>KEY RESOURCES

• Wise Control know-how
• Brand
• Prototype design
• Supplier network
• Customer database
• Mobile app</td>
<td>CHANNELS

• Current Wise Control clients
• E-commerce website
• Online marketplaces
• Social media
• B2B partnerships</td>
</tr>
<tr>
<td colspan="3">COST STRUCTURE

• Production costs
• R&D investment
• App development
• Marketing expenses
• Logistics
• Inventory management</td>
<td colspan="2">REVENUE STREAMS

• Initial product sales
• Recurring attractant replacements
• B2B bulk sales
• Potential subscription model</td>
</tr>
</table>

2.2. Market validation and projection

To validate the project, we have used two main sources of information: an anonymous survey of 100 people and three interviews with experts in the pest control and mosquito control sectors.

All of these sources confirm that the product is desirable (72% of the surveyed people were willing to buy the product if it showed effectiveness) and that the problem will continue growing in the future: all the interviewed experts highlighted that proliferation areas for the mosquito will progressively increase in the future, especially in urban areas, signifying an increase in diseases and stress for the population. Also, a very important insight we extracted was the pain point between effectiveness and the use of a clean technology (as mentioned previously).

Since this existing gap in the market, The Quito project introduces the Blue Ocean strategy. Our product is clearly differentiated from traditional competitors by combining elements that do not coexist in existing products: effectiveness, design, sustainability, preventive education and non-toxic actives.

Regarding projection, from the 19,75 million households that exist in Spain, more than a third use anti-mosquito domestic control products. Our mid-term objective is to capture the 3% of this market share. In the long-term, we aim to expand solidly into the European market, especially into the Mediterranean areas, which are particularly affected by mosquitoes.

2.3. Contribution to Sustainable Development Goals

The Quito is directly linked to and committed to the achievement of three SDGs by addressing a growing public health challenge through an innovative and responsible solution.

SDG3 Good health and well-being

The main contribution of the project is linked to public health protection. As globalisation and climate change scale, it is proven that species such as *Aedes albopictus* (Asian tiger mosquito) increase in population and in the transmission of diseases such as Dengue, Zika and Chikungunya. The Quito reduces the human exposure and the actual active population of mosquitoes to spread. Moreover, regarding the survey we performed, 40% of the surveyed people reported high stress due to mosquito presence during the warmer months, showing the significant impact these species have on daily life quality.

SDG9 Industry, innovation and infrastructure

The Quito contributes to innovating a conservative industry, such as the pest control industry. The product is a 360 innovation, changing the traditional perception of a trap into an aesthetic element, that is clean and effective while closely linked to prevention education. We have implemented design thinking into pest control products, thinking from the customer, which is also a very innovative milestone. The mixed model (service plus products) for a company is also quite innovative for the sector. This new business model allows Wise Control Pest to diversify its traditional service model. Lastly, this project promotes innovation within an industry where current solutions are still ineffective and outdated.

SDG15 Life on Land

The Quito has a direct impact on biodiversity, as we reduce the dependence on chemical insecticides, which are commonly used in domestic mosquito control. Current alternatives release toxic substances into the environment, impacting humans, harming non-targeted species and contributing to environmental contamination. Our solution promotes responsible pest management practices, aligned with current demand trends.

3. Background and personal motivation

Wise Control Pest S.L. originated as my father's personal project. After several years working for a large company in the sector, he decided to establish his own business. Without any formal business education (only some free courses provided by the government for new entrepreneurs), he founded the company in 2017, based in Santa Perpètua de Mogoda, Barcelona. Although it is a small company, its growth has been steady over the years. I joined the company in 2024, when my father decided to implement an ERP system to digitalise internal information and improve the efficiency of different processes. I took this role, and with my knowledge of business administration, I have been helping him expand the firm since then.

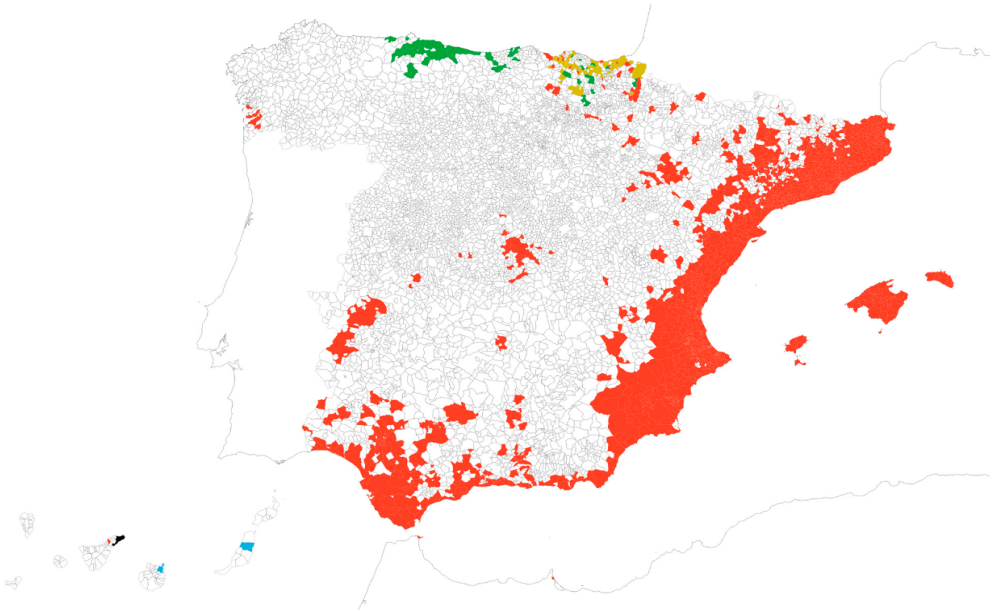
My personal motivation begins with the strong admiration I have for my father and his success. He does not have any formal business education or a university degree; however, his extensive expertise in the sector, as well as his personal skills, have enabled the company to work with major clients at both regional and national levels. By combining this knowledge with my background in business, in recent years, we have improved many operational cycles and have also expanded into additional sectors. Another motivation stems from the fact that pest control services are required in nearly every sphere of economic activity, making growth opportunities highly feasible. Moreover, there is considerable potential to expand into different sectors involving both personal and professional environments (restaurants, hotels, private homes, public institutions, among many others). This constitutes the starting point of my motivation for this project.

Bearing in mind the opportunities that the sector offers in terms of innovation and the potential to reach different customer segments, I developed the idea of focusing this project on the creation of a product that is effective in pest control while also appealing to younger generations, particularly those who are progressively moving out of their parents' homes into their own living spaces. Essentially, households are currently the least profitable segment of our business, which is the main rationale behind this project: to make small clients more profitable and more attractive to younger generations, who represent an emerging market. The development of this product aims to achieve a balanced combination of efficiency and safety (two non-negotiable aspects in the sector), while also offering distinctive value by being visually appealing for use in private homes. Typically, pest control products designed for household use have a rough or unattractive image. The traps commonly used in private homes are usually hidden and tend to be visually unappealing. Although this may seem like a minor detail, when targeting households, and especially younger consumers, the visual component becomes a highly relevant factor.

The next step was to determine which need in terms of pest control was more urgent. The assumption that nearly all plagues are being controlled in households (rodents, cockroaches, ants, termites…) except one: The Asian tiger mosquito (*Aedes albopictus) and the* Common mosquito or house mosquito (*Culex pipiens). Aedes albopictus* has been detected in 1,768 Spanish municipalities, representing 21.7% of all municipalities in the country. These municipalities encompass a total area of 108,626 km², corresponding to 21.5% of the national territory. In contrast, the population residing in affected areas amounts to 31,789,424 individuals, which constitutes a substantially larger proportion (66.2%) of the total national population. This species is especially focused on the Mediterranean coast (our main operation area as a company) and is dangerous for humans, as they can transmit several health issues, like dengue, chikungunya and Zika (World Health Organisation, 2025).

Figure 1

Map of Spanish municipalities with reported detections over the period 2004–2024 of Ae. albopictus



Note. From *Integrating Citizen Science and Field Sampling into Next-Generation Early-Warning Systems for Vector Surveillance: Twenty Years of Municipal Detections of Aedes Invasive Mosquito Species in Spain* by Eritja, R. et al. (2025). *Insects*, *16*(9), 904. https://doi.org/10.3390/insects16090904. (N = 1699, red), Ae. japonicus alone (N = 43, green), overlapping detections of Ae. albopictus/Ae. japonicus (N = 68, ochre), Ae. aegypti alone (N = 2, blue), and overlapping Ae. albopictus/Ae. aegypti (N = 1, black). Map reference: BDLJE CC-BY 4.0, National Geographic Institute—Canary Islands displaced from their actual position.

Despite this, within our current customer base, demand for mosquito control represents less than 1%, in terms of sales, of the company's total pest control activity. This situation reveals a clear market gap, in which a growing opportunity has been identified: the development of a product aimed at mosquito control, that is affordable, safe, easy to use and that fits a home perfectly. This product will primarily target private households, while also being suitable for use in restaurants, schools, and hotels. In order to fulfil this purpose, the product must not only be efficient and safe, but also visually appealing.

For the successful development of this project, the core team will consist of my father and me, combining sector-specific expertise with academic knowledge in business administration, as well as a clear understanding of the target market. In addition, the company benefits from the support of its technical staff, who are responsible for implementing pest control measures, and from its suppliers, who provide the materials and products essential to the company's operations. All these actors represent key stakeholders in the development of the project, as the objective is to design a product that meets client needs while also taking into account the operational requirements of technicians and the capabilities of suppliers.

4. Market analysis

With this market analysis, we aim to understand the overall trend in terms of the expansion of competition in the pest control sector in Spain, as well as the growth of profit opportunities related to this economic activity, through both a macro and a micro analysis. Moreover, a detailed analysis of mosquito presence in today's context will be conducted, as our project will focus on this pest.

4.1. Analysis of the pest control sector

The pest control sector is gaining relevance worldwide due to urbanisation, climate change, stricter hygiene standards, international trade and, consequently, the spread of invasive species. Previously known as extermination, pest control activities do not represent the extermination of an insect colony, but the prevention, monitoring and environmental management of different co-living species. Demand is especially growing in hospitality, food industry and public health segments, but is also gaining force in residential and private spheres. The sector is influenced by regulation but also by innovation: worldwide tendencies grow towards sustainable and non-toxic approaches that are in constant evolution.

4.1.1. Analysis of the pest control sector globally

Globally, this sector is considered essential, as it provides a service whose objective is to protect food systems' public health infrastructure, housing quality and business continuity (in diverse sectors such as hospitality, chemistry sector, pharmaceutical sector and food sector, among many others). The current scenario of growth in urban areas, business expansion and development, climate change and overall globalisation configure the long-term structural terms that benefit the sector. There are several multinational companies that have a strong presence throughout countries and continents, such as Rentokill Initial, Anticimex and Ecolab; however, the sector is highly fragmented: it is basically configured by medium and small-sized companies that cover regional to national territories.

When analysing the relevance of the sector globally, we cannot forget that climate change is reconfiguring climates across the world, and new territories are becoming suitable for more vector-borne diseases that are carried by an invasive species. This is a global threat that highlights the importance of pest control services in both the public sphere and the private sphere. The clearest example is the expansion of the Asian tiger mosquito, whose habitat suitability has increased by 5% between 2000 and 2020 in the Mediterranean area. This pattern is consistent worldwide, and it is estimated that approximately 70% of the global land area is a suitable habitat for these species (particularly condensed in Europe, North America and Africa).

4.1.2. Analysis of the pest control sector in the EU

In the European market, the main differential factor is that it is more regulated than other regions, especially if we consider the regulation that applies to chemical pest control products. The regulation in the EU 528/2012 is the Biocidal Products Regulation and requires the active substances to be authorised before reaching the market. This regulation increases costs for development companies and pest control companies, but also acts as a barrier to entry and encourages safer innovation.

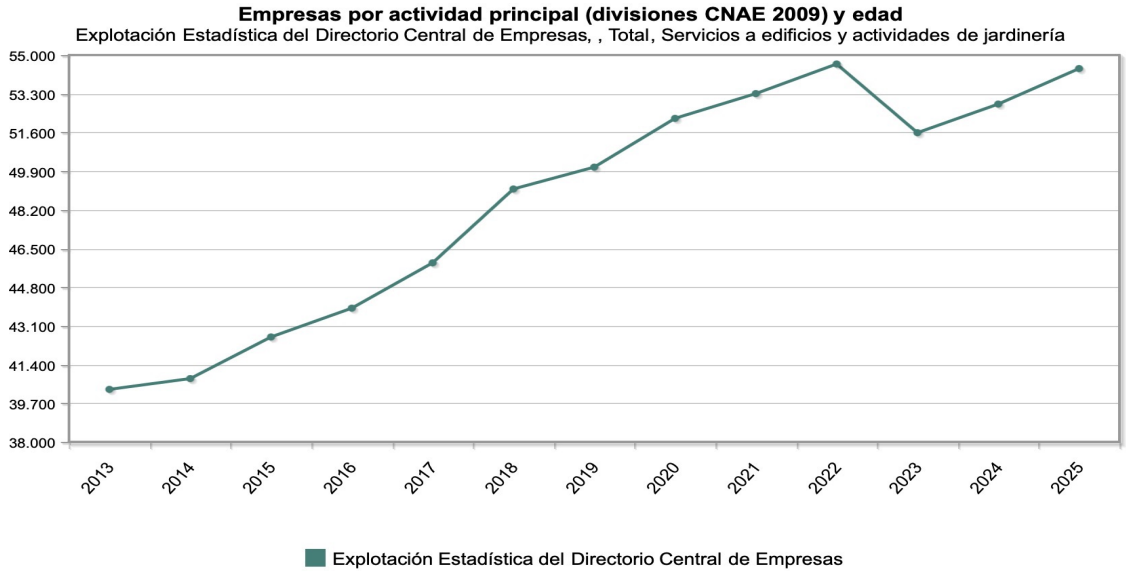
This market is particularly shaped by high environmental and consumer standards, high demand in the food industry, tourism, hospitality, and housing. Also, the preferences of clients grow towards the adoption of low-toxicity alternatives that are fully adapted to their activity or lifestyle.

4.2.1. Evolution of the pest control activity in Spain

This graph shows the number of active companies in Spain whose main activity is services to buildings and gardening activities (CNAE Code 81). This division is broad, but it includes pest control services in Spain. It is noticeable that the market is expanding, and competition as well. Since Wise Control was founded, nearly 10,000 more businesses within the sector have arisen. No official records have been found about the exact number of pest control companies within this division, but estimates suggest that a reasonable and realistic range is between 1500 and 2000 companies in the country.

Figure 2

Number of companies by their main activity (CNAE 2009 division)

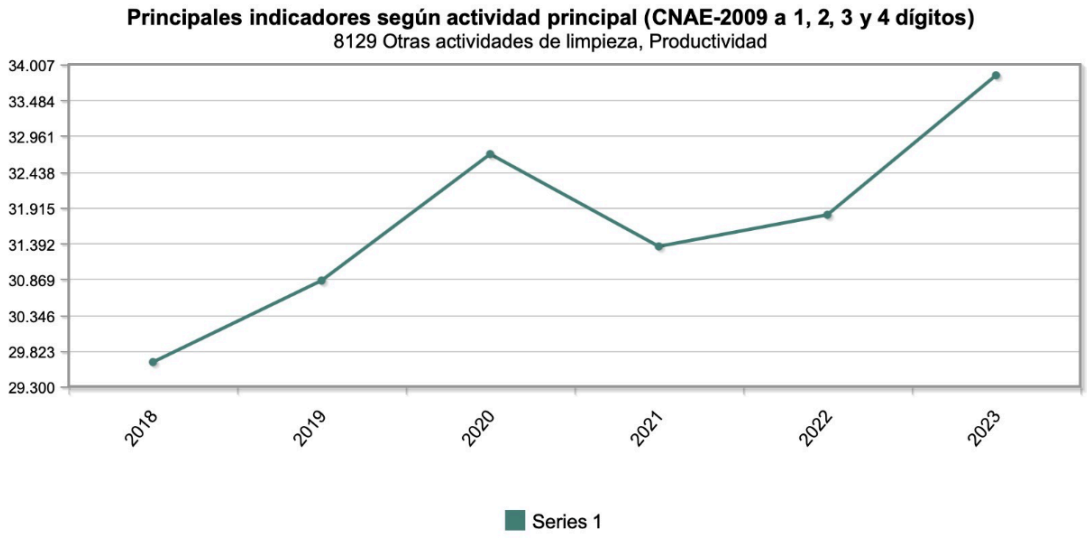


Note. "*Empresas por actividad principal (divisiones CNAE 2009) y edad (3954)*" by INE - Instituto Nacional de Estadística. (2025). INE. https://www.ine.es/jaxiT3/Datos.htm?t=3954#_tabs-grafico

Regarding subdivision, pest control companies fall under the 8129 "Other cleaning activities" economic category. This is another indicator showing how the sector has been expanding in terms of profitability in recent years. This graph measures the profitability of the factors that contribute to the economic activity of the sector, specifically the average economic value generated by each worker (the main factor in this sector).

Figure 3

Main indicators by activity: other cleaning activities division.



Note. From *Principales indicadores según actividad principal (CNAE-2009 a 1, 2, 3 y 4 dígitos)* by INE - Instituto Nacional de Estadística. (2023). INE. https://www.ine.es/jaxi/Datos.htm?tpx=78937#_tabs-grafico

As shown in the graph, productivity within CNAE 8129 has followed an overall upward trend between 2018 and 2023. This evolution may suggest that, although short-term fluctuations occur, the sector is generating more value efficiently over time, reflecting its profitability and growth potential within it.

4.2.2. PESTEL analysis (macro analysis)

This section aims to analyse the macroeconomic environment influencing the pest control sector in Spain through the PESTEL framework. The pest control industry is strongly linked to several external factors that must be thoroughly understood, including public health, legal

regulation, and environmental protection. Social and technological trends also have a significant impact on the development of the sector and, consequently, must be considered.

Political factors: The pest control sector in Spain is closely linked to public health and safety, since its services directly affect hygiene conditions in domestic, commercial, and industrial environments. For this reason, pest control activity is influenced by public health priorities and by the need to ensure safe practices for citizens and workers. In addition, companies operating in this sector face increasing compliance demands, which often translate into higher administrative and operational costs. Furthermore, the need for qualified professionals and technical expertise reinforces the importance of professionalisation as a key requirement to operate in the market.

Economic factors: Operating costs have been rising significantly over the last few years. Chemical products, fuel and labour are reaching record number costs for companies. This situation is especially relevant in pest control services, as technicians need to travel in specialised vehicles that are fuel-driven, and it has a direct impact on transport expenses. In addition, the growing adoption of alternative products to conventional chemicals also raises costs, as these solutions are usually more expensive due to the technology required to develop them. In this context, strong price competition within the sector puts additional pressure on profit margins, making cost control a strategic priority. However, as shown in the previous analysis (e.f, figure 3), the profitability of the resources involved in this activity has increased over time, suggesting that despite higher costs, margins have also improved across the sector.

Social factors: Customer expectations and service demand in the pest control market are being shaped by several social trends. Hygiene awareness has increased significantly, particularly after the COVID-19 pandemic. At the same time, customers are more concerned about health and safety, especially in environments where children or pets are exposed to chemical products or invasive or aggressive procedures. As a result, there is a clear shift towards safer approaches and a growing demand for pest control solutions that are perceived as more environmentally responsible.

Technological factors: Technological development has always been relevant in the pest control sector, but it has gained importance in recent years due to the digitalisation of internal processes. A general tendency is that sectorial companies are implementing service management software (as ERP systems) to improve operational efficiency, reporting and communication with clients and traceability of the services given. Furthermore, there is an increasing trend towards the use of smart tools and traps, such as sensors and connected devices, which provide innovative solutions for detection and preventive control. Nevertheless, these technologies often require substantial investment and may not be suitable for all types of clients, particularly those seeking domestic solutions.

Concluding, innovation in the sector is continuous and a real opportunity for differentiation, however, it also increases the need for investment in technological development (very expensive for small to medium companies).

Environmental factors: Environmental considerations are becoming increasingly relevant in pest control activities, mainly due to growing pressure to reduce the use of toxic chemicals and improve sustainability in pest management techniques. This pressure comes both from regulatory institutions and from customers, who are progressively more demanding regarding environmental impact. This trend is also linked to expectations for proper waste management, since the use of biocides generates hazardous waste that must be disposed of correctly. On one hand, the sector is facing incentives to adopt techniques that are more environmentally respectful, as they provide reputation and innovation to the existing practices. On the other hand, these approaches can be more difficult to implement or may not achieve the same level of effectiveness against certain plagues. This creates a trade-off between sustainability objectives and operational performance in daily operations.

Legal factors: The legal framework is one of the most influential elements in the sector. Regulation is particularly strict regarding the use of biocides, the authorisation of products, and the professional application of treatments. These requirements are largely driven by European Union regulations, which impose high standards of safety and control. Consequently, companies must comply with extensive documentation and technical obligations, which increases administrative workload and compliance costs. At the same time, these legal requirements function as an entry barrier.

Based on the PESTEL analysis and the macroeconomic context of the sector, it is possible to conclude that this is a highly competitive market, particularly in terms of price. There are many companies operating in Spain, and price competition has a direct impact on profit margins. However, other factors can determine the competitive advantage of firms within the sector. The adoption of greener techniques, a wide range of alternative procedures adapted to client needs, as well as professionalisation and experience, can provide differentiation and create barriers to entry for competitors. Moreover, strict compliance with legal requirements is essential, as investment in compliance, service quality, and innovation can position a company more favourably within the market.

4.2.3. Porter's Five Forces analysis (micro analysis)

To comprehend the microeconomic environment affecting the pest control sector, Porter's Five Forces framework will be employed (industry competitiveness in Spain) with the objective of understanding the sector's competitive dynamics. Based on previously analysed data (e.f, figure 3), we observe that this sector in Spain is progressively achieving

higher productivity rates. The application of this framework allows for a more comprehensive understanding of the sector.

Figure 4
Porter's five forces diagram

Competitive Rivalry: Competition is divided into two groups: numerous small/local firms and a few larger national groups. Competition is primarily based on price, response speed, and service quality. However, the macroeconomic analysis (PESTEL framework) indicates that competition is increasingly incorporating ecological and ethical practices. Furthermore, an analysis of companies registered in the National Statistics Institute (INE) under category 81 reveals an upward trend in competition. According to ANECPLA (National Association of Environmental Health Companies), the Spanish pest control sector is composed of more than 500 associated companies, representing around 80% of the industry's total turnover. This suggests that the total number of active pest control firms in Spain is likely above 600 companies, including small independent operators. The pest control market is highly fragmented, and most of the competition is small to medium-sized players. Some large groups include Anticimex and Rentokill; however, the large majority of companies in the sector are regional and small. Consequently, the sector is characterised by a high level of competitive rivalry.

Threat of New Entrants: Entry barriers exist, including requirements for training, licenses, and regulatory compliance. Nevertheless, it remains feasible to establish a small company with limited initial investment. The estimated investment for a small-sized pest control

company is typically between 25,000€ and 60,000€. The overall threat of new entrants is low to moderate.

Bargaining Power of Customers: Large clients exert significant negotiating power, demanding lower prices and strict service conditions. Nevertheless, in many professional sectors (such as industry, hospitality, restaurants, media, supermarkets, among others) pest control services are mandatory. As such, customer bargaining power is limited, given that these services are essential for the daily operations of businesses. For smaller clients, bargaining power is relatively low due to tighter profit margins. Overall, customer bargaining power is considered medium.

Bargaining Power of Suppliers: The sector strongly depends on specialised chemical products and equipment. Consequently, supplier power varies according to brand availability and regulatory constraints (as these constraints are continuously changing and adapting to new regulations). Suppliers frequently offer discounts for bulk purchases or prompt payments. Supplier power is generally low to medium.

Threat of Substitutes: Although some products are available directly to consumers through supermarkets or online platforms, most clients facing pest issues ultimately rely on professional services, which are more effective. The threat of substitutes is low to moderate, both for industrial clients and for household clients (some of the substitutes of a professional control would be an anti-mosquito plug-in, citronella, sprays, among many others). However, it is key to contrast this fact with the reality that this sector **is a growing market with opportunities.**

The combined insights from both PESTEL and Porter analysis indicate that the pest control sector is highly regulated and intensely competitive. External pressures, such as sustainability demand, compliance and hygiene awareness, shape the reality of the market.

4.3. Our focus: the mosquito plague

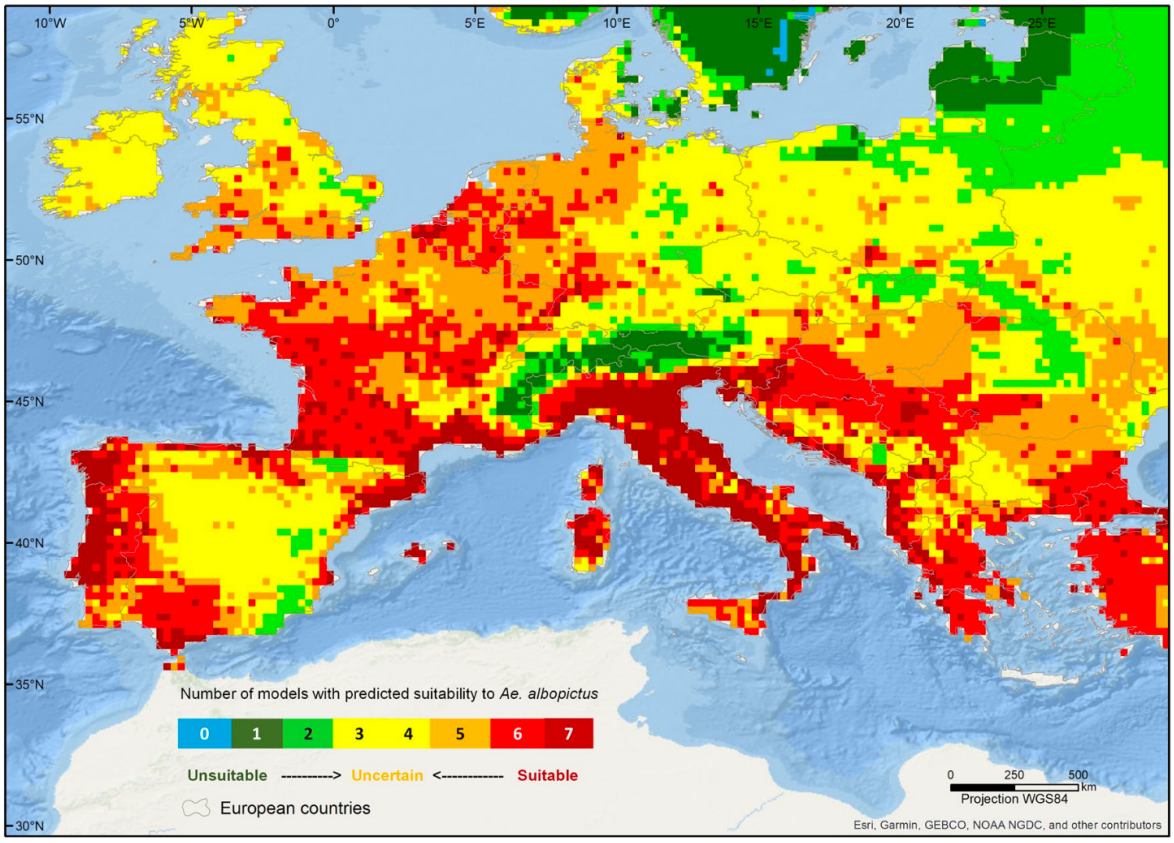
To provide further detail, the product and target of this project focus on mosquito control. Pest control activities are directly influenced by the prevalence of infestations in both rural and urban areas. This scenario is increasingly relevant: with growing urban populations and the effects of climate change, pest populations, including mosquitoes, are tending to increase. The scope of our project is directly linked to the distribution and proliferation of these pests, both currently and in the future. Consequently, it is essential to understand the magnitude of the issue through an in-depth analysis of the mosquito behaviour and patterns of expansion.

4.3.1. Current situation and future trends

First, a review of suitable habitats for mosquitoes can help in understanding their behavioral patterns. Whether mosquitoes are encountering open pathways for expansion or, conversely, facing a reduction in habitable areas is a key factor. The following two figures present an analysis of current and projected suitable and unsuitable areas in Europe for the establishment and proliferation of the species:

Figure 5

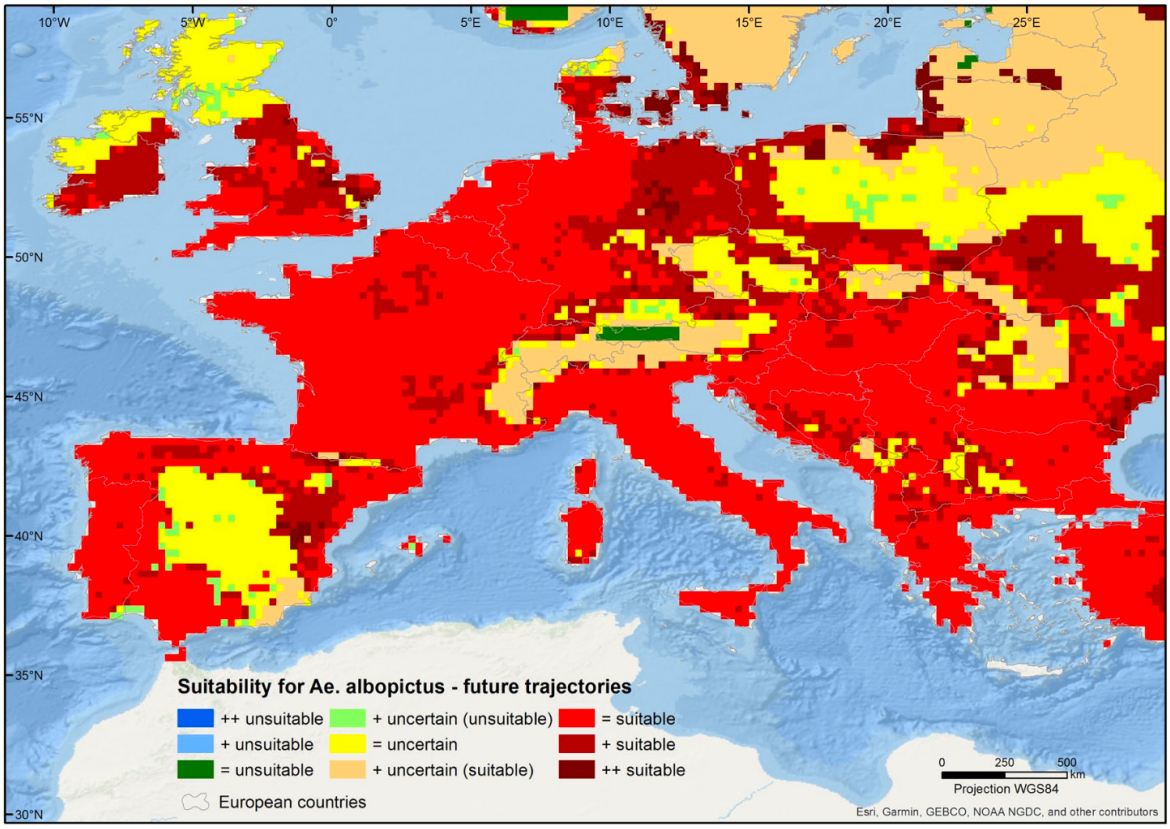
Levels of agreement among published predictions of habitat suitability for Aedes albopictus under present-day conditions.



Note. From *Wide and increasing suitability for Aedes albopictus in Europe is congruent across distribution models* by Oliveira, S., Rocha, J., Sousa, C. A., & Capinha, C. (2021). *Scientific Reports*, *11*(1), 9916. https://doi.org/10.1038/s41598-021-89096-5. Levels of agreement among published predictions of habitat suitability for *Aedes albopictus* under present-day conditions. Agreement corresponds to the sum of binary suitability maps, with suitable areas coded as one and unsuitable areas as zero.

Figure 6

Future trajectories of suitability for Aedes albopictus in Europe.



Note. From *Wide and increasing suitability for Aedes albopictus in Europe is congruent across distribution models* by Oliveira, S., Rocha, J., Sousa, C. A., & Capinha, C. (2021). *Scientific Reports*, *11*(1), 9916. https://doi.org/10.1038/s41598-021-89096-5. Trajectory represents a different combination of predicted status (suitable, uncertain, unsuitable) in the two timeframes (present and future). The map was created using ArcGIS v. 10.6.1 (https://www. arcgis. com/).

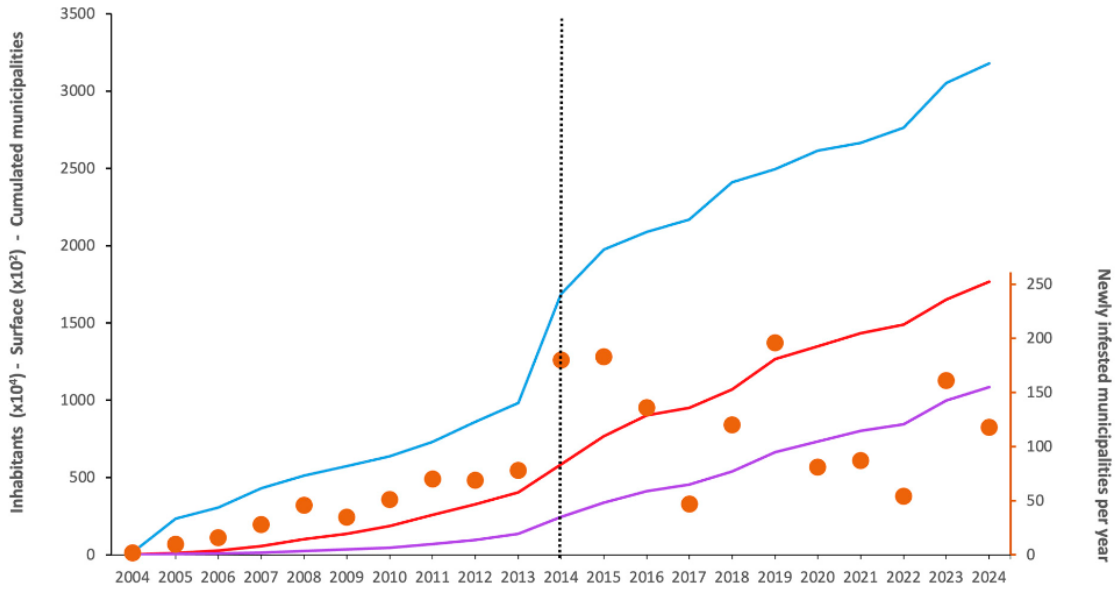
Currently 49% of the 65 major European urban areas are predicted to be suitable for the species, 39% show uncertain suitability, and 12% are predicted to be unsuitable. These proportions shift noticeably under future conditions: 83% of urban areas are predicted to be suitable by the majority of individual predictions, while none are predicted to be unsuitable. The remaining 17% are classified as uncertain in the future, with at least half of the models indicating potentially suitable conditions. These future scenarios are based on a 30 years projection (article from 2021).

Moving into a national context, the next figure shows the temporal evolution across the

study period in terms of affected surface area, number of inhabitants, and municipalities, presented both as accumulated totals and as annual new additions.

Figure 7

Aedes albopictus cumulative number of affected inhabitants, municipalities and occupied area in Spain



Note. From *Integrating Citizen Science and Field Sampling into Next-Generation Early-Warning Systems for Vector Surveillance: Twenty Years of Municipal Detections of Aedes Invasive Mosquito Species in Spain* by Eritja, R. et al. (2025). *Insects*, *16*(9), 904. https://doi.org/10.3390/insects16090904. Cumulative number of affected inhabitants (blue line, scaled by 1×10^{-4} for easier visualisation), cumulative occupied area in km² (purple line, scaled by 1×10^{-2}), and cumulative number of municipalities (red line). The dot series corresponds to the secondary y-axis (right) and represents the number of newly infested municipalities per year.

This timeline reflects the twenty years since the first detection of Ae. albopictus in Spain (the first detection of an invasive mosquito species occurred in 2004) and the start of Mosquito Alert activity in 2014 is marked by the vertical dashed line, where increasing tendencies can be appreciated. To put these numbers into perspective, this species is present in 22% of the Spanish land, but it affects more than 66% of the Spanish population. Due to climate change, and supported by these studies, we can conclude that the problem of mosquitoes will increase over the next few decades, reaching new areas in the entire continent.

With this statement, we can also conclude that the pattern worldwide will follow the same tendency: over time, more areas of the globe will be suitable environments for the proliferation of this species.

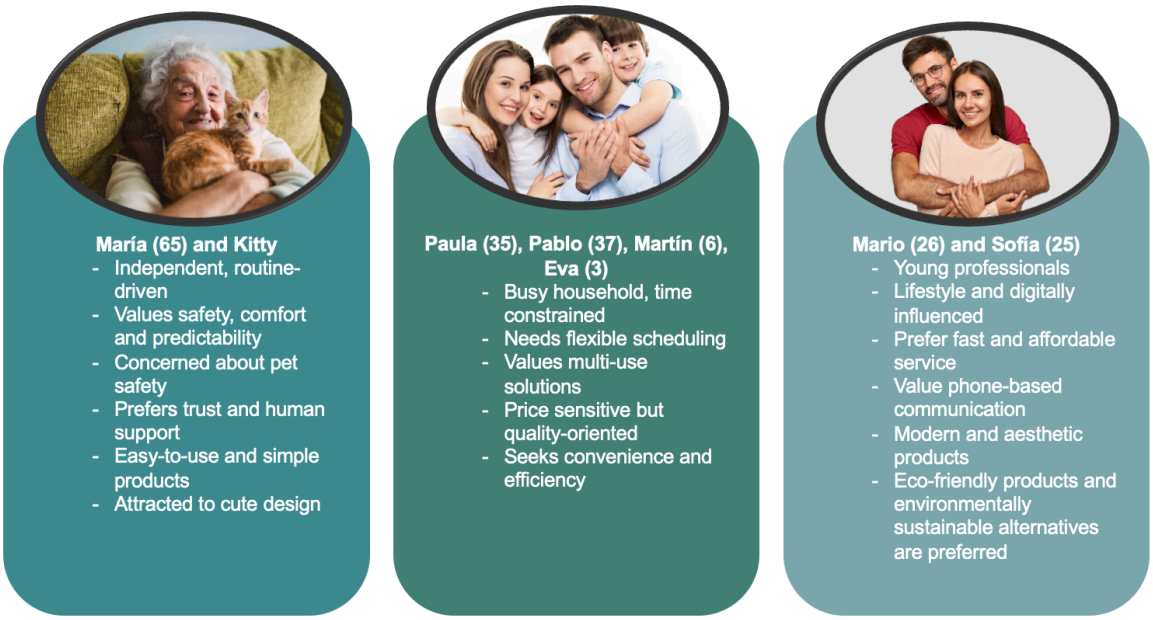
4.3.2. Clients and buyer personas

In our company, we serve a wide range of clients; however, they can be classified into two main groups: individual clients (households) and professional clients (companies, public institutions, among many others). For the purposes of this project, we will focus on individual clients, as they will constitute the primary target audience. Any individual may require professional pest control services at some point in their life, particularly if they reside in densely populated areas. Our current clientele is concentrated in the Greater Metropolitan Area of Barcelona.

There is no unique profile that defines the target client, as anyone who owns a home could potentially require our services. This presents a challenge, as our solutions must be adaptable to diverse households, including young individuals, elderly people, large and small families, pet owners, and various household dynamics. Recognising this diversity, also including differences in socio-economic status, is essential when developing the project. In order to create a buyer persona, we initially tried to define a standard client; however, this approach does not adequately reflect the realities of the sector. Consequently, we developed **three archetypes** to represent segments of our client base. We find the challenge in the design of a product that is capable of addressing the needs and preferences of these three distinct buyer personas, which emulate and reflect a part of our client baseline.

Figure 8

Three archetypes of buyer personas



María (65) and Kitty (cat): This profile is an older adult, independent, routine-driven and values simplicity. Her priorities are safety, comfort and predictability. When requesting pest control services, she values trust and human support, as well as pet wellbeing (she is worried that chemicals can endanger Kitty). If she were going to use a new product, the key is to go with an easy-to-use product: *"Make my life easier without confusing me."* She also feels more attached to a product if she considers it to be "cute".

Paula (35), Pablo (37), Martín (6) and Eva (3): This household profile is a busy family that relies on time-saving and convenient alternatives to daily activities. When requesting pest control services, it is important that services are adapted to their adjusted schedule. If they were going to try a new product, they value multiuse or shared access to products. They are price sensitive, but they also value quality. *"Solve the chaos and save us time."*

Mario (26) and Sofía (25): This household is formed by a young couple in their early career. They are lifestyle-focused and impacted by digital trends. When requesting pest control services, they require a fast and affordable alternative, and value fluent and easy communication through their phones. If they were going to try a new product, some requirements would be accessible, modern, and that offer a brand vibe. *"I want a product that performs well, and that fits my lifestyle: functional, modern, and aesthetically beautiful.* They also value environmentally sustainable options, as they believe that choosing non-toxic products and options with less environmental impact can make a global change.

Three archetypes, although having very different realities and lifestyles, show a common emotional driver: they want less stress and more control, but they are also driven by aesthetic (they value trends, sense of quality and cuteness). María wants control without confusion, the family wants control without overload, and the young couple wants control without wasting time. **With this analysis, we conclude that our product proposal should make mosquito control easy, reliable, tailored to the customer's life and environmentally friendly.**

4.3.3.1. The competition

The innovation in the pest control industry has not yet reached a mosquito trap for domestic use that fulfils the following characteristics: non-toxic, elimination of mosquitoes (no repellent but attractive technique), and visually adapted to the domestic environment.
For the analysis of competition, two branches have to be analysed: domestic traps and professional control. Our product will fit into the category of domestic traps. In terms of competition, other players have to be taken into account as professional services. The following analysis provides an overview of the existing products and methods used in Spain for mosquito control in domestic scenarios.

Domestic products and domestic traps

Personal protection products (repellents): These products come in different mechanisms and shapes (sprays, bracelets) and are considered as regulated biocides by the Spanish Agency for Medicines and Health Products (AEMPS). They are directly applied to clothes or skin to prevent bites. The AEMPS emphasises that improper use can increase the risk of irritation or accidental exposure to sensitive areas such as the eyes, mucous membranes, damaged skin, or wounds. With these alternatives, protection is time-limited, and more frequent application than recommended does not improve efficacy but may increase unnecessary chemical exposure. Special caution is suggested for vulnerable groups, especially children under three years old, who require adult supervision. Lastly, overexposure to these biocides does not guarantee better protection from insects (Agencia Española de Medicamentos y Productos Sanitarios, 2026).

The portfolio of products that fit inside this category is:

- DEET repellents
- Icaridin and Picaridin repellents
- IR3535 repellents
- Plant-based repellents (for example, lemon eucalyptus or citronella based repellents). Effectiveness is highly variable compared to DEET/icaridin repellents.

Electric devices: They mostly work using pesticides or chemicals that are allowed for domestic use. Another common characteristic is that these devices are electric, so without electricity, they are ineffective. UV insect lamps with an electric grid and indoor UV devices combined with chemical attractants are commonly used to reduce mosquitoes in homes and terraces. However, their effectiveness against mosquitoes can be limited, as UV light often attracts other insects more than mosquitoes. They may also pose safety concerns (as the electric grid), require regular cleaning and maintenance, and can lead to unnecessary killing of other non-targeted species.

BG Mosquitaire Traps and similar devices:
These outdoor traps use attractants and suction to capture mosquitoes without chemical biocides. However, their performance can vary depending on placement and environmental conditions. They typically require continuous power (as they are also electric) and regular maintenance. Their control is limited to an area that may not be sufficient on high infested settings.

Figure 9
BG Mosquitaire model

Note. Picture from Biogents.

Physical barriers: Do not require chemicals and are efficient, but very space-limited, as they can only provide coverage in some rooms or closed spaces. This family of products, including window and door mosquito screens, do not require chemicals to provide protection from mosquitoes, as they prevent the insects from entering indoor spaces. However, their effectiveness depends on correct installation and good maintenance, as small gaps or damage on their structure can allow mosquitoes through. They also do not reduce the actual

mosquito populations and may limit ventilation or require additional measures when doors and windows are frequently opened, especially in warmer months.

Professional techniques

Professional techniques cannot be replicated by a non-professional individual, so they can only be applied when hiring professional pest control services. The main distinction between this second approach and the self-use alternatives is the price: in these scenarios, we face higher costs for families as the cost includes human labour, materials, time and transportation to the premises. These professional services are tailored to the life stage of the mosquito to offer a more efficient solution. The methodologies are guided by the Spanish Ministry of Health and outlined in the National Plan for the Prevention, Surveillance, and Control of Vector-Borne Diseases (Ministerio de Sanidad. Plan Nacional de Prevención, Vigilancia y Control de las Enfermedades Transmitidas por Vectores, 2023).

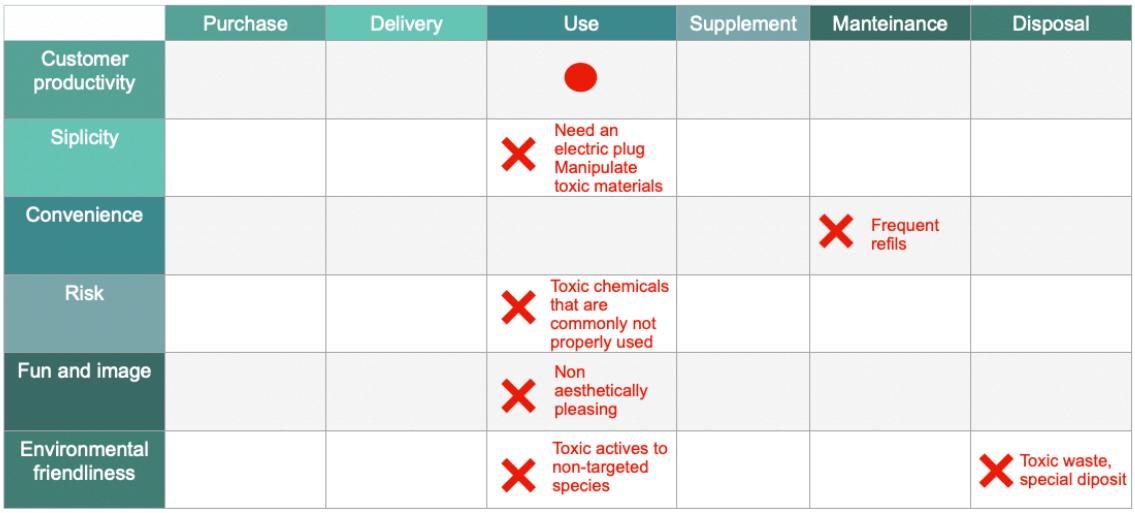
Professional mosquito control and Integrated Vector Management combine prevention, larval control, targeted adult treatments, and monitoring, usually carried out by municipalities or specialised professionals. Larval control is based on source reduction by removing standing water. This is essential, however, it can be difficult to maintain consistently in urban areas due to many hidden breeding sites. The treatments for adult mosquitoes are mainly spraying or fogging with approved biocides. These treatments can raise concerns about environmental impact, toxic exposure to people and animals, and the development of insecticide resistance. Overall, these techniques are effective but on the other hand are very aggressive, impacting resources, requiring more time and people to apply them, as well as the impact the use of insecticides has on the population and on the environment.

4.3.3.2. How to unlock exceptional utility for households?

For a clear visualisation of the gap in the domestic mosquito control market, we will use the Buyer Utility Map to illustrate this gap. This analysis incorporates the buyer personas we have created.

Figure 10

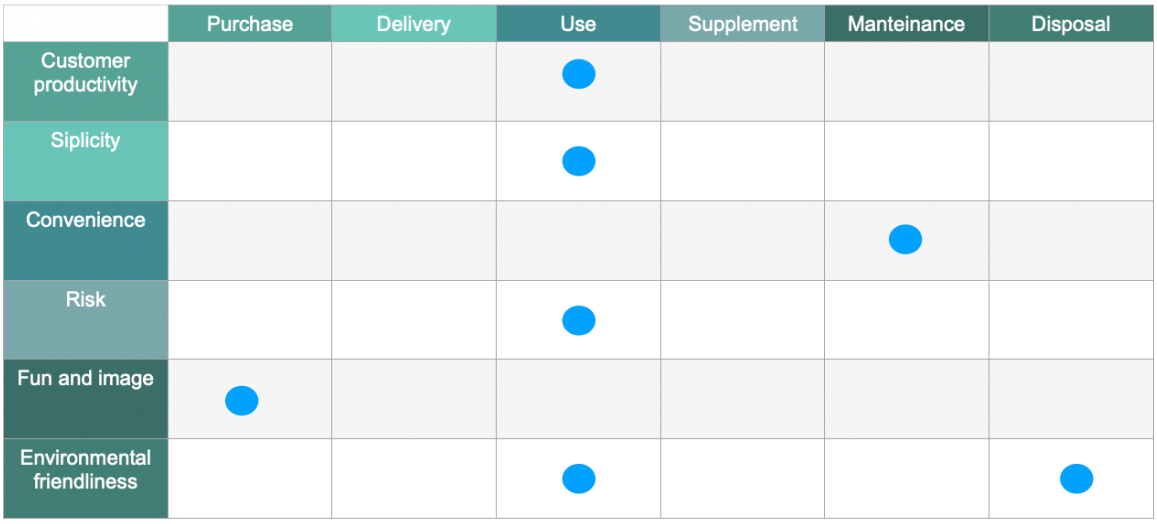
Current market offering applied to the Buyer Utility Map framework



The red dot represents the current market offering, which is focused on productivity. Current products are focused only on the productivity use. However, the red crosses highlight that the current market has some pain points that none of the existing alternatives solves.

Figure 11

Blue ocean strategy applied to the Buyer Utility Map framework.



Blue dots represent the gaps in the market, or the blue ocean opportunities. Regarding existing products, none of them can fulfil all of these considerations simultaneously. Filling

this market gap could result in the ultimate gadget for mosquito control in domestic scenarios.

The product must encompass all of the following characteristics to take advantage of the market gap:

- Productivity is key, as the main reason for clients to purchase is to eliminate mosquitoes.
- Ease of use and convenient maintenance are essential so that the product can be used by all the different household profiles we aim to reach.
- A risk-free alternative to pesticides and chemicals is another critical aspect and perhaps the most difficult to achieve.
- A distinctive visual design is also important, as this factor is absent in all current alternatives. All existing traps have an industrial and sober design, even when intended for domestic use. The experience of using them is not pleasant and does not foster a brand connection with customers.
- Environmental friendliness is increasingly relevant, as identified in the macroeconomic and microeconomic analyses. The use and disposal of traps should be as sustainable as possible, and developing a safe alternative for humans, the environment, and other species is essential to achieve fair and sustainable control.

4.4. Legal aspects of the product

As previously stated, the pest control sector is strictly regulated; when developing a product inside the sector, regulations have to be taken into account. The competent body for domestic use of insecticides is the AEMPS; however, if the product does not contain insecticides, this regulation is not applicable.

This project aims to develop a clean and efficient trap; consequently, **this strict regulation will not apply**. Moreover, not using any toxic materials ensures that no special regulation about domestic manipulation of the product applies. This makes the development of the product much easier and less restricted by the administration.

The most important legal aspect to consider is testing the claim of reducing mosquito populations in a space. This claim can only be made with previous evidence that the active ingredient (attractant, repellent, or killer ingredient) is capable of performing well against the population.

Lastly, it is important to know and properly indicate the waste handling by the company and by the end consumer. When facing toxic active ingredients or chemicals, the process is more complex, as they cannot be recycled as regular waste. Access to toxic waste

management is a daily activity for pest control companies; it is more complex if this disposal has to be performed by families. In our case, we aim to develop a product with no toxic waste, so only regulation for typical waste will be applied.

5. Business definition

5.1. Context of the business model in pest control companies

To gain an insight into how our company operates, and how the new product will be integrated, it is key to understand that pest control fits into the public health and environmental management sector. This sector is strictly regulated by the EU, since we work with the over population of some species and the products that are used in this sector can be potentially harmful for humans. Our company is specialised in the management of these situations, by providing professional services in the prevention, detection, management, and elimination of pest infestations for both private clients and commercial clients. The control of species such as rodents, cockroaches, ants, termites, flying insects, and nuisance birds are our core activities.

Our organization's objective is to provide integrated pest management solutions with an emphasis on effective, safe, and environmentally respectful practices that align with EU public health standards. One of our value propositions is that we offer comprehensive inspections and professional documentation support, that includes free on-site evaluations and quotes as a starting point for the strategic plan to control the plague. As we have mentioned, a key element is to adopt methods that balance efficacy and safety and this goes through the importance of using the best and most adequate products targeted at specific pest species that also minimise risks to humans and the surrounding environment.

The traditional business model operation consists of the evaluation, development of actuation plan (how many visits are required for the elimination of the plague, the most suitable products to be used and how are going to be applied in the treated space). Afterwards, the action plan takes place, and this cycle is repeated until the plague is erased (in the households case) and indefinitely in commercial clients that require by law having a pest control service under their activity. This cycle covers the integrity of one year since the strategic plan is developed.

During this period, clients have a full coverage of extra visits (if needed) covering summer months, where most plagues have their top activity through the year.

5.2. The product

The Quito (whose name was developed as a mix between the word “Mosquito” and the verb in Spanish “Quitar”) will signify a revolution in our business model regarding particular clients. This new trap will be offered as a complement for their regular pest control plan with Wise Control Pest. This product is completely autonomous and primarily focused on the control of mosquitoes in households.

The mechanism of the trap was mainly inspired by the mechanism of the previously analysed BG Mosquitaire Traps, but was fully adapted to the usage and design of indoor house rooms.

Figure 12

The Quito 3D prototype designs

The Quito is a decorative vase designed to make any room appear elegant and well-composed. However, it conceals a mechanism that captures mosquitoes in a highly effective and discreet manner. The mechanism consists of two parts: the vase (Designs 1 and 4) and the top component (Designs 2 and 3). These parts are separable in order to facilitate maintenance.

The vase is manufactured from plastic. The choice of plastic for the trap is based on the fact that most traps for domestic and professional use are designed in this material to avoid disruption of the capturing process. Plastic is innocuous to mosquitoes and allows the scent of the attractant to be perceived more rapidly. The bottom of the vase must be filled with water by the user, and its primary function is to trap the mosquitoes.

The top component is the most complex part, as it contains the attractant system. The attractant consists of a plastic cylinder containing a scent that emulates human odour, which attracts mosquitoes. The cylinder is mounted on a spike within the top component, allowing the attractant aroma to diffuse outward through the funnel. Upon detecting the scent, the mosquito enters the funnel and becomes trapped, as mosquitoes are unable to fly upward in a straight vertical flux.

Its **clean technology** is its strongest point. The structure of The Quito is made to last, as the plastic is very resistant to time, shocks, and water. The only disposable part of the

product is the attractant. The attractant is a small tube of plastic that lasts up to 6 weeks. The customer will know when it is time to change it, as they will have **The Quito App**. This app will be a tracker on when to change the attractant, and this is especially helpful for clients, but also for the operations regarding The Quito: we will collect information from our customers' profiles, as well as help to do a forecast on the attractant's stock. When the app suggests that it is time to change the attractant, it has to be detached from the top of the product and recycled as a plastic container. This is key: the attractant container can be disposed of by households in the regular yellow container, as **it does not have to be recycled as toxic residue.** The attractant is not toxic, and when it is fully evaporated, the container has to be thrown away as you would do, for example, with water bottles. Being able to recycle the material of the attractant ensures zero waste for The Quito. Also, the water inside the container can be thrown away with complete normality, as it is not contaminated nor toxic, thanks to the clean technology.

The clean technology is also key in terms of differentiation. Most mosquito home control devices are fed with chemicals to repel or kill the insects. These practices do not ensure a safe space for animals or vulnerable individuals (such as babies or elderly people), and some invasive techniques (such as fumigation) force households to remain uninhabited for a prudential period of time. The Quito works through a mechanical process of killing the mosquitoes, that is, through drowning. This technology is revolutionary, but also the cleanest and safest alternative for mosquito control.

5.3. Value proposition

The main value proposition is that it is not a service; it is a product. Usually, professional pest control must be performed by specialists, as the active ingredient is toxic and can only be handled by a professional. The Quito is completely different: it is designed so that the low maintenance required to keep it functioning during the mosquitoes' active months can be carried out by the users themselves. Despite not being a service for the company, the client can get the service feeling through the introduction of the App. They can feel more accompanied remotely when using this product.

Value proposition for clients: A passive trap that will capture mosquitoes in the home, without any toxic materials, and is designed to be handled only by adults (safe for human manipulation and safe to be around pets and children). The attraction technique, in contrast to other methods such as citronella, captures mosquitoes rather than causing them to fly away, **keeping rooms free from these insects**. Other advantages include:

Table 2

Average invoice price for individual clients.

Code	Total
202500519	242
202500508	350,68
202500506	356,95
202500505	290,98
202500495	315,86
202500487	506,02
202500481	269,06
202500471	290,98
202500470	242
202500469	496,1
202500455	716,81
202500449	382,3
202500441	297,04
202500437	169,74
202500436	169,74
202500429	315,86
202500417	965,8
202500415	699,56
202500414	145,2
202500405	541,03
202500401	726
202500387	2238,51
202500368	305
202500364	570,5
202500363	1445,95
202500355	121
202400305	1292,28
202400221	907,5
202300024	2404,8
	612,94

- No need to schedule visits with our technicians during the summer, when it is particularly inconvenient for households.
- Very low maintenance.
- Vase designed to be long-lasting (only requiring replacement of the attractant and water).
- Visually pleasing design suitable as part of home decoration.

Value proposition for the company: No additional technician work is required during visits, other than explaining the mechanism of The Quito. The product targets a pest problem that is currently untreated on a small scale (households), allowing the company to increase profitability among smaller clients. The average invoice for standard household pest control[1] is currently €612,94; adding this product would significantly raise the average invoice, as another plague will be incorporated into the portfolio of each client: profits from this new product would increase household segment profitability.

To formulate our value proposition, it is key to understand how much a household in Spain spends in a year on mosquito control products. We aim to give a complete solution that fits into the price range households are currently paying for other products. Although we do not have an official number, estimates based on household consumption data and retail market behaviour suggest that Spanish households spend approximately €25 to €35 annually on mosquito-control products, with significantly higher expenditure in coastal and warmer regions. We can extract these numbers, as most of the anti-mosquito products fit inside the range of 5 to 10 euros, and the seasonality is nearly 6 months long (April-October), so households refill their products 3 to 4 times a year.

[1] We just consider regular plagues as rats, cockroaches, ants and flies. Other plagues such as termites are excluded from this calculation as the process to control is longer that the regular 1-year plan and the price of the invoice is significantly higher due to the complexity of this type if control. Also in this average only single houses or flats are considered, not multi-unit residential communities, for simplicafion.

Opportunities are not limited to household clients. The company could also offer The Quito to professional clients in sectors such as restaurants, hotels, residences, hospitals, and many others. In these cases, as with other pests, multiple units would be deployed within the facilities, allowing the company to benefit from economies of scale.

Focus on the mass market: Regarding the opportunity cost of offering this product exclusively to existing clients, the goal is not to limit the market to current customers but to expand and acquire new clients through The Quito. Generally, household clients only seek pest control when facing an infestation. In contrast, professional clients are almost always required by law to maintain pest control services. The aim is to reach clients without existing services with this product, introducing them to the company's broader offerings for other pest issues. As noted previously, mosquitoes affect populations that are likely not currently clients of pest control.

5.4. Vision, mission and values

The definition of the vision, mission and values is essential to understand the strategic direction of Wise Control Pest S.L. and the impact that the incorporation of a new product line has on an already established company. In this case, the development of The Quito expands the organisation's offering (in terms of services and covering necessities that have never been faced), and also partially transforms its strategic focus, moving from a model based exclusively on professional services to a hybrid model that incorporates preventive products aimed at the diverse end consumer.

Company Vision

The vision of Wise Control Pest S.L. is built on its experience as a company specialising in pest control within the fields of public health and environmental management. The incorporation of The Quito helps redefine this vision by expanding the company's reach towards new market segments and new models of value creation

Short-term vision (1 year)

In a short-term view, we consolidate this new product line as a strategic complement to our core activity. In this time frame, the company aims to integrate The Quito into its regular operations, not only using it as a tool to improve profitability in the private customer segment, but also strengthen its positioning as an innovative company in the business pest control field. This product aims to be integrated but not to change how we actually operate, since our operating system is the most efficient one to treat different plagues at once, and also the most suitable system for our customers, as it fully adapts to each individual's needs and schedule. The main goal in this stage is also to receive feedback from our customers about this product to validate that every aspect we aimed to create is actually translated to our customers. Within this year, we also aim to launch the product for customers who are

not in our baseline of clients, through **online purchase**. This will make the product known to many more people, making it recognisable and popular, but also the first step of awareness for Wise Control. We aim to rapidly scale and create a recognisable brand, to prevent other players from copying our product, and to be one step further with our proposal. With some key partnerships and a bold name in the market, we will gain a competitive advantage regarding future players that will appear.

Medium-term vision (2 years)

During this period, the company's vision is to consolidate The Quito as a recognised product in the mosquito control market, especially in areas affected by invasive species such as *Aedes albopictus*. This area is, essentially, the Mediterranean part of the Iberian Peninsula. We aim to expand to this area, as currently our area of influence is the greatest metropolitan area of Barcelona (almost 95% of our clients are from this area). In this way, the company evolves towards a more scalable model, while maintaining its technical specialisation, closeness with clients and personalised service.

Long-term vision (3-5 years)

The goal to reach in a long term vision, is to be a national reference as a company, due to the innovation and consolidation of our own portfolio of products and services. For The Quito itself, we aim to reach larger segments, gaining targets in other countries. As it is aligned with European public health and environmental standards, it can be purchased from nearly any part of the world (as European standards are very high in this field). The ultimate vision is to consolidate ourselves as the most effective and complete alternative to mosquito control in domestic scenarios, bearing in mind the health of users, the environmental impact of the product and the aesthetics it has for complementing every household.

Company mission

Traditionally focused on providing professional pest control services, the mission is expanded with the incorporation of the new product line. Wise Control's mission is to offer pest control solutions that are effective, safe, and responsible. The company is committed to protecting both public health and the environment, applying specialist technical expertise while strictly following all current regulations.

This mission is also reflected in the development of The Quito, a range of self-use products designed to help private users prevent and manage mosquitoes, supporting a stronger culture of the prevention of this plague in everyday domestic settings.

Regarding the way The Quito is integrated into the company, Wise Control bridges the gap between professional pest control know-how and the end consumer, making reliable, professional solutions more accessible for use in the home, always in a practical and responsible way.

Company Values

The values of Wise Control Pest S.L. constitute the ethical and operational framework that guides both its traditional service activity and the development of the new product line. These principles are key to our activity, as they guarantee security and legal compliance.

Safety, health protection and environmental sustainability. The company has the responsibility of offering safe alternatives for our clients, that are secure to use around people, animals and that are also safe for the environment. We aim to avoid the use of toxic substances whenever effective and safe alternatives exist, especially in domestic settings.

Technical expertise and regulatory compliance. All solutions are developed bearing in mind technical, scientific and legal criteria (following the EU regulations).

Innovation. We consider innovation as a powerful tool to address new arising needs of our clients. Traditionally, we have adapted to new technologies, and this claim for innovation is strengthened with the incorporation of The Quito.

Customer orientation and commitment. User-centred approach, by understanding every client's needs. Also, control criteria are always communicated to the client since being transparent with the process of pest control is key to developing trust from our customers, and they. As a family-owned company, we want to maintain transparency and closeness with our clients and partners, despite expansion.

6. SWOT Analysis

This analysis aims to synthesise the whole business proposal in terms of external and internal factors that our business will face. Positive and negative variables will be considered when validating the proposal and will be addressed in the contingency plan.

Table 3

Swot analysis

Opportunities: External and Positive Factors	Threats: External and Negative Factors
Growing mosquito prevalence: Climate change and urban expansion are increasing mosquito populations, creating a growing market demand for control solutions. **Market gap, the *Blue Ocean* opportunity:** Existing domestic solutions are limited in combining efficacy, safety, and design. The Quito fills this gap in the market. **Expansion potential:** Opportunities to target professional clients (restaurants, hotels, hospitals) and expand geographically beyond Barcelona and Spain, as mosquito prevalence is detetected among all Europe. **Trends in sustainability and health awareness:** Increased consumer focus on non-toxic, ecofriendly, and safe pest control solutions supports adoption. **Aesthetics of the product:** Potential integration of future trends in interior design, taking advantage of personalisation to reach to a wider mass.	**High competition in pest control services:** Price-based rivalry and established service providers in Spain may limit the immediate adoption of a new product. **Regulatory changes:** Although The Quito is non-toxic, changes in domestic pest control regulations could impose new requirements. **Consumer behaviour uncertainty:** Households may prefer traditional chemical-based solutions or repellents due to familiarity or perceived higher efficacy. **Economic pressures:** Rising material costs, shipping, or inflation could impact production and pricing strategy. **Emerging alternatives:** Future technological innovations by competitors could reduce The Quito's perceived uniqueness or effectiveness. Also exists the risk of being duped by other brands.

Strengths: Internal and positive Factors	Weaknesses: Internal and Negative Factors
Innovative product design: The Quito combines effectiveness, safety, and aesthetics, differentiating it from existing domestic mosquito traps. **Non-toxic and environmentally friendly:** The trap avoids harmful chemicals, making it safe for households, pets, and children, aligning with growing consumer demand for sustainable solutions. **Integration with existing business model:** The Quito complements Wise Control's professional pest control services without requiring additional technician labour. **Market knowledge and expertise:** Wise Control has technical and regulatory expertise in pest control, ensuring credibility and trust with clients. **Scalable product:** The attractant system is easy to replace, the trap is durable, and the product can expand beyond Barcelona into other regions and internationally. **Customer-centric approach:** Buyer personas have been carefully analyzed, and The Quito is tailored to diverse household needs, focusing on convenience, control, and stress reduction.	**Limited brand recognition for products:** Wise Control is known for professional services, but The Quito is a new consumer product requiring marketing to establish awareness. **Reliance on domestic adoption:** Success depends on household adoption and education about proper use. Incorrect usage could reduce effectiveness. **Production and distribution logistics:** Manufacturing, packaging, and distribution of a new product line introduce operational complexity and a significant first investment. Also, little experience in the manufacturing sector.

7. Validation of the Business Concept and Final Assessment

In this part of the project, the aim is to understand the viability of the product. For this reason, we will take an in-depth look at the three pillars for the development of the project: **customers, suppliers, and pest control technicians**. The objective of this analysis is to obtain a picture of how the sector would perceive the product, and how our potential customers would accept and adopt The Quito as a real solution and alternative for mosquito control.

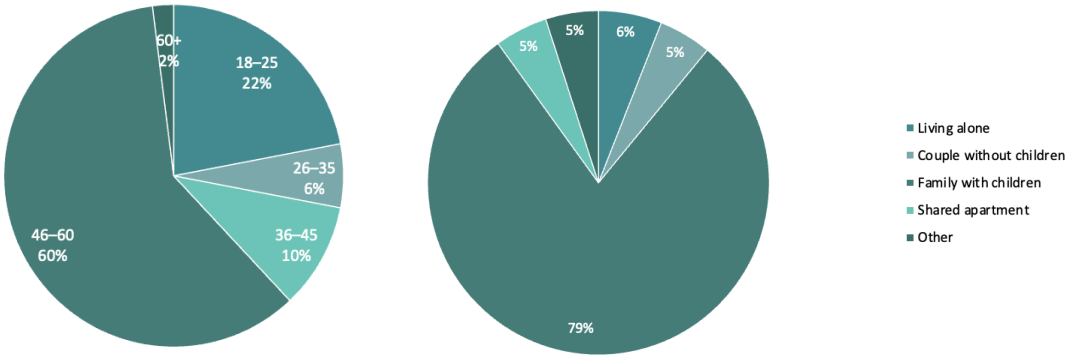
7.1. Quantitative Analysis of Potential Customers

The first validation to analyse is the customers' insights obtained through an anonymous survey conducted with 100 people. This quantitative analysis will provide an approach to defining the customer persona, determining whether it matches the previously established buyer personas, and understanding their perception of current solutions compared with our proposal.

The first part of the survey aims to understand how different demographics face the mosquito issue. In terms of demographic parameters, it is crucial to comprehend the age of the respondent and their household pattern. One of the strong points of The Quito is that it is a safe option for children, as it is non-toxic; this is the reason behind the importance of knowing the representation of household composition.

Figure 13

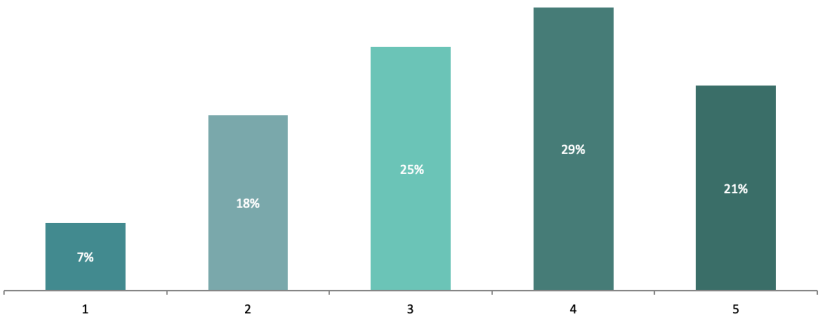
Demographics of the respondents: age and household pattern



In the first graph, we can see that 60% of the people who were anonymously interviewed are between 46 and 60 years old. Combining this fact with the results shown in the second graph—where 79% of the people are part of a family with children household pattern—we can extract that the majority of people who answered have children.

Figure 14

Levels of stress reported by respondents regarding mosquito presence in warm months

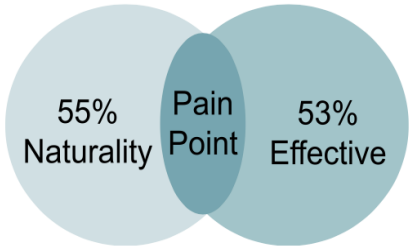


In terms of how respondents feel stressed by mosquitoes during warm months, 40% feel very bothered and extremely stressed, 25% feel moderately stressed, and 25% feel rarely stressed or only slightly stressed.

Based on the reach of the survey, we deduce that most of the respondents are from the greater metropolitan area of Barcelona. This result is particularly interesting, as it is a high-incidence area. This is reflected in the results of this specific question, as stress derived from mosquitoes is mostly rated on the 4–5 scale.

Figure 15

Diagram of pain points for respondents

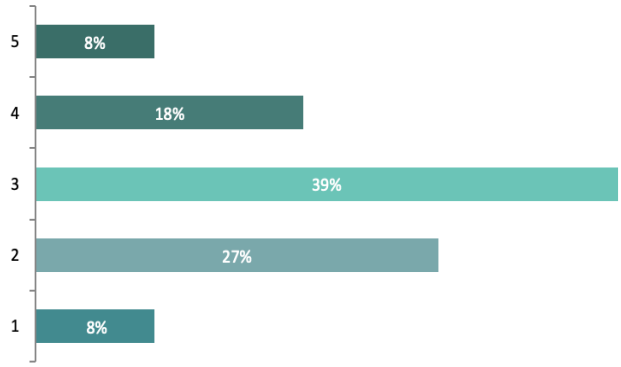


In order to understand where our customers are currently looking for solutions, we wanted to analyse which products are currently being used and the pain points of consumers. The most used alternative is natural repellents (such as citronella), which 55% of respondents report using. This is followed by chemical alternatives such as sprays, used by 53% of respondents. We can extract that both naturalness and effectiveness are crucial for customers when looking for a solution. This is where our first pain point arises: **the difficulty of finding an alternative that fulfils both.**

Electric devices represent 42% of usage, which implies that a significant portion of the analysed target is willing to pay for more expensive alternatives, and physical barriers represent 40% of the total. It is also significant that only 1% of respondents have ever contacted professional pest control services to fight mosquitoes. This confirms our previously established hypothesis about the lack of professional control over the mosquito plague.

Figure 16

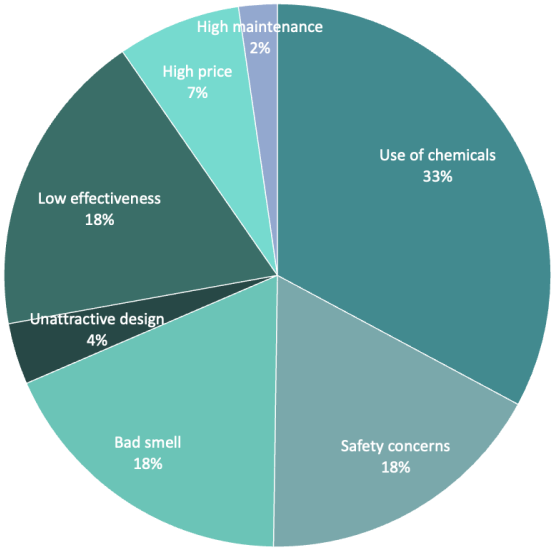
Respondents' levels of satisfaction with current solutions



In terms of satisfaction, we can conclude that most respondents are not satisfied with current solutions, with 35% feeling very significantly dissatisfied with their current options. The largest group, representing 39% of respondents, positions itself in a middle-ground satisfaction level. This establishes a premise regarding the existing gap in customer satisfaction, as most respondents report having used different alternatives but still do not feel strongly satisfied with them.

Figure 17

Reported reasons of dissatisfaction with current anti-mosquito techniques



The reasons behind this negative perception of existing solutions are varied, and respondents provide a significant range of explanations for disliking widespread mosquito control products. The most repeated reason is the use of chemicals. Although respondents use chemical products available on the market, they also report significant concerns about the use of these substances.

These conclusions are aligned with the validation of The Quito prototype. A detailed description of the product was given to respondents in order to understand their perception of the idea. Seventy-seven percent of respondents rated the **appeal** of the prototype with a score of 4 or 5, indicating considerable excitement for the product. When asked which aspect of the prototype was most attractive, 84% responded that it is **chemical-free** and **non-toxic**. This highlights the importance of safe alternatives in the analysed households. We can determine that for adults with children, ensuring health security in the household is crucial. This is also supported by the fact that 59% of

respondents highlighted that the attractiveness of the product relies specifically on being a **safe option for children and pets**.

On the other hand, the main concern expressed by respondents is the performance of the product. Here, once again, the hypothesis regarding **the pain point between naturality and effectiveness is confirmed.**

Another pain point that The Quito aims to solve is full integration with home decoration. We also wanted to test whether this is an important feature for future customers. Thirty-one per cent of respondents consider the **aesthetics** of the trap to be very or extremely important. A hypothesis that arises here is that respondents might not be fully aware of how a decorative trap could look or the potential additional uses it could have. Although 31% is a significant percentage, most respondents positioned themselves in the middle range, indicating that design is neither a barrier to entry nor a strong driver of consumption. This specific feature will be tested in another part of the project.

In terms of the expected price respondents would be willing to pay, 49% set their maximum price for the **trap at €20**. For the **attractant** (which must be periodically replaced), the acceptable price range is set **between €5 and €10 per unit.**

Lastly, we found that 72% of respondents would be willing to try this product if it proves to be effective. Respondents positioned themselves at levels 4 and 5 on a 5-point scale, allowing us to conclude that the market is willing to try new alternatives, as long as they solve the pain point between naturality and effectiveness.

7.2. Validation of the product with sector professionals

7.2.1. Company owner

For the product's qualitative validation, it is crucial to interview a sector professional to assess the product's **technical viability**. In this interview, I could talk with José Ferreira Álvarez, the technical manager at Wise Control Pest. His experience in the sector is shaped by a trajectory of 23 years in urban pest control and more than 35 years in the phytosanitary sector. This interview is especially crucial as the product is aimed at expanding this company. José identifies that most of our clients are private individuals and small businesses, but we also work with larger companies in the food, chemistry, and pharmaceutical sectors, which are the strongest companies within the industry.

First of all, I wanted to validate the problem of the mosquito plague from a professional perspective. The mosquito (especially *Aedes albopictus*) is a spreading pest, active for more months of the year and closely linked to urbanised environments and homes. Even environmentally aware households cannot control the problem on their own if the surrounding environment (neighbours, the community) does not cooperate. This lack of cooperation often comes from the thought that households individually cannot control mosquitoes: “Even when households adopt preventive measures, individual control is

insufficient due to the community-based nature of the pest." This validates the fact that for clients, mosquitoes are a pain point; however, they do not know how to fight against them. This pain point is continuous in time and structural, which implies that they seek a structural solution.

José mentioned the fact that the domestic market is unserved, which implies an opportunity for development and innovation. He also validated the gap between this pest and the search for professional activities: it is highlighted how often it is not a matter of price but a matter of effectiveness, "clients are willing to pay if a product genuinely works." That is the reason that lies behind a market trend to go for products rather than for professional services in this case.

When moving into current solutions, the professional confirms that the pain point between non-toxicity and effectiveness clearly exists. This trade-off arises since the most effective products are the ones that contain biocides (which are also toxic for humans). These products also require correct use and cause fear and rejection in households. Moving into the other side of the spectrum, José reports that natural repellents such as citronella show very low effectiveness, also in closed spaces. Regarding plug-in devices, they require more maintenance and logistics, as well as providing little effectiveness during the day (when Aedes often bite humans). Lastly, it is highlighted that the efficacy of physical measures, although these methods are often rejected for the aesthetics. We can conclude that there is an unresolved conflict between effectiveness, safety, and customer experience in the current solutions. **The necessity of a non-toxic, passive, and** household-adapted **product is validated.**

The most critical insight and the single point of failure of the product detected by the professional is the attractant: "if the attractant does not work, the product fails." The professional considers the product to be a highly desired alternative and to be an excellent concept; everything relies on the effectiveness of the passive attractant. José strongly suggests researching attractants before validating the product to ensure effectiveness. Another key insight is the growing rejection of chemical solutions. This is the real differentiation and is the value proposition validation: "even without symptoms, exposure to chemicals is a concern for individuals."

Regarding another differentiation feature of the product, the professional highlights the importance of design. The design is not only about aesthetics, but also functional, as having a hidden passive mechanism facilitates adoption and increases the suitability of a home context.

Lastly, as José is the owner of the company in which we aim to incorporate this product into the business model, we wanted to ensure the fit for the existent business model. In this strategic validation, we ensure that it is **a perfect complement for current services**: often, existing clients report the active presence of mosquitoes, and this demand

is increasing. José recognises the product as a cross-selling opportunity for existing clients but also as an entry point for new customers. The hybrid model (which includes products and services) for the company is validated. This path of expansion is viable and does not cannibalise our current and existing activity.

To briefly summarise the ideas presented, the interview clearly validates the existence of a growing, unresolved problem in domestic mosquito control and confirms the conceptual fit of the proposed product. The main risk is not market acceptance or business model, but the technical efficacy of the passive attractant, which is the critical success factor for the project.

7.2.2. Interview with the head of the technical department of Killgerm

Josep Parnau is a technical expert in the pest control industry with more than 20 years of experience in this sector. He currently represents the Technical Department of Killgerm Spain, which is an international distributor of pest control products. They operate across many European countries and are one of the main suppliers of Wise Control Pest, as well as for many pest control companies inside and outside Spain. Parnau holds a degree in Biochemistry and Biology and later graduated in Business Administration. He has worked in scientific research, but his current role is focused on technical support and regulatory guidance for pest control companies. This focus is mainly directed at professional and public institutions rather than private consumers; however, the insight of a supplier is crucial to understand the demand and the limitations of existing solutions in the market, as they also affect the solutions that can reach the private sphere.

The expert confirms that the main hypothesis for our market analysis is true: **mosquito issues are progressively becoming more relevant in Europe due to climate change and the reappearance of diseases driven by vectors.** He highlights the impact of the West Nile virus in the south of Spain, which was related to deaths in these areas. These events tend to increase awareness; however, he affirms that mosquito control is still a relatively small market: “Within insect control, mosquito control might represent around 10–15%, and in our overall revenue, it probably does not even reach 5%.” Despite this fact, he also insists that it is a growing market, as it depends heavily on innovations.

Another crucial insight that has reshaped the project is that mosquito management typically focuses on preventive strategies. This is very important, as adulticides are a bit more complex to apply and can have a minimal environmental impact. “A good intervention would first involve training and advice… keeping vegetation clean and avoiding accumulations of water where mosquitoes breed.” These results are valid for both public and private contexts and made me rethink the use of the trap. **Not only is the elimination of adults a key factor, but also the prevention of the larvae.** This can be achieved with some tips and

very simple preventive actions that have to be translated to the final consumer. A non-toxic trap fits well with the current regulatory approach, but including an educational feature in the product would also align with the environmental approach that public and private institutions have regarding this plague. This will be taken into account for the following action plans.
Another point that is confirmed is whether the trapping system is valid for mosquito control. Josep highlights that multifunction traps can be useful both for capturing and monitoring the plague (both features are key for regulation).

Going into the technical aspects of the trap that I am proposing, the importance of a proper attractant has already been highlighted. Josep notes that attractants are very useful and can have different compositions such as lactic acid, urea, or octenol. CO_2 is also used as an attractant that simulates body emissions. Water is also crucial for the trap system, as it attracts gravid females that are looking for a place to lay eggs, so the trap would have a double attractant system.

The expert explains that **the domestic market is much larger than the professional one**, although it is more difficult to operate in, as products have to be simple and intuitive to use, as well as safe for the domestic environment. These expectations align with the proposed prototype, and Josep adds that “If a trap is well designed, in the right place, with good distribution, the potential is very large.” Our prototype could fill this gap identified by the expert.

In conclusion, Parnau considers that **the proposed mosquito trap is technically valid and fills an existing gap**. We also validate the hypothesis that the mosquito control market will grow in the coming years due to environmental and epidemiological factors. Although the concept of a trap is not new, a well-designed product with proper distribution, accessible pricing, and positioning for the domestic market represents an opportunity with great potential.

7.2.3. Interview with the head of Urban Pest Surveillance in Barcelona

Tomás Montalvo is the head of the Urban Pest Surveillance and Control Service at the Agència de Salut Pública de Barcelona, where he has worked since 2003. He is responsible for the Mosquito Surveillance and Control Program, as well as the Vector-Borne Zoonoses Program. He is also a researcher at the Centro de Investigación Biomédica en Red (CIBER) in Epidemiology and Public Health and a lecturer in the Master’s in Public Health program at Universitat Pompeu Fabra (UPF).

Montalvo is a biologist, ornithologist, and entomologist. Since 2004, he has been involved in coordinating prevention strategies, monitoring mosquito populations, and implementing control programs in the city of Barcelona.

The first key insight is the public health concern that invasive vector species represent: “The tiger mosquito appeared in Barcelona in 2005, and since then it has expanded across the Mediterranean coast wherever conditions allow it (…) It is a competent vector for dengue, Zika, and chikungunya, which changes the epidemiological scenario.” This implies the urgency for public institutions to control their expansion. However, Montalvo highlights that mosquito proliferation is particularly noticeable in residential spaces (gardens, patios, and terraces). In summer, as we tend to ventilate, the ecosystem for mosquitoes expands from the outside of our homes to the inside of our homes. This is when the expert considers that mosquitoes become not only a health risk but also a major quality-of-life issue for households in the warmer months.

Tomás also validates the new concept I will be complementing the trap with: **education for prevention.** “Providing information to citizens about what they should do at home to avoid breeding sites is fundamental.” Another important action line for The Quito is unlocked, as the expert explains how a system of multi-traps in domestic environments could complement public prevention efforts by reducing and monitoring populations. An important idea that was discussed in this interview was how techniques used by professional and public institutions involve approximately 95% application of larvicides; however, the opposite applies to domestic use, as biological larvicides are not available for private use. This gap in accessible mosquito control solutions for households supports the opportunity to develop a new domestic alternative.

Lastly, I wanted to check a hypothesis arising from the quantitative analysis: the trade-off between efficacy and environmentally friendly mosquito solutions. In terms of public solutions, this trade-off does not exist, as larvicides are completely innocuous; however, since this technique cannot be applied in domestic areas, this pain point is real. He highlights how **the search for environmentally respectful solutions is a growing trend.**

In conclusion, the expert confirms that controlling this increasing problem has limitations, which are specifically linked to private environments. Controlling mosquitoes is not possible without preventive measures in outdoor private areas, as well as educating the population about them. These insights support the potential relevance of developing innovative domestic solutions that fully adapt to and educate private environments.

8. Action plan

The action plan will determine the essential steps to follow to achieve the correct and successful implementation of The Quito.

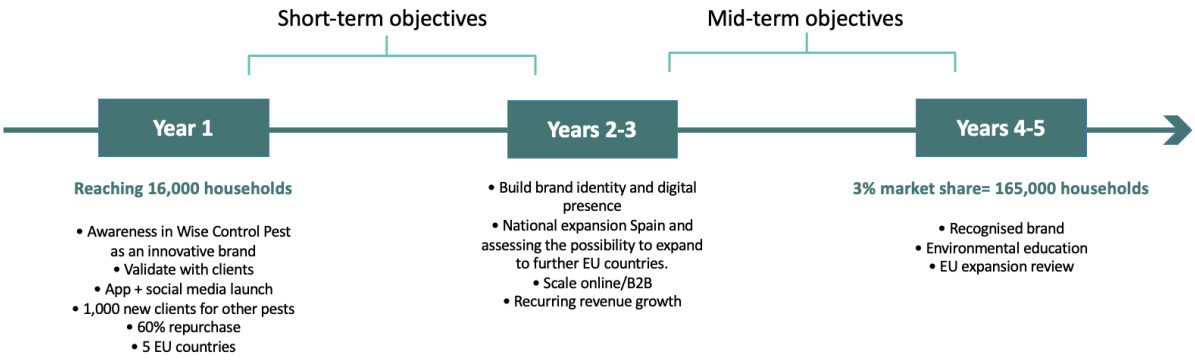
8.1. Objectives

The establishment of clear objectives is essential to implement The Quito correctly within a new business line, both inside and outside Wise Control Pest. In this project, the SMART framework will be used to set goals in a Specific, Measurable, Achievable, Relevant, and Time-bound way. This framework also allows for evaluating the progress of this project in a realistic and structured manner.

To have a sharper view, we will distinguish between two timelines: short-term objectives and long-term objectives. It is also key to differentiate and complement quantitative and qualitative objectives.

Figure 18

Timeline of Short-term and mid-term objectives for "The Quito" project



8.1.1. Short-term objectives

The main short-term objective for The Quito is to raise awareness about this innovation within Wise Control Pest's activity. This awareness involves positioning this domestic mosquito control solution among our clients and gathering insights from them. Validating the product with our current clients is crucial while preparing to reach the mass market, as some adjustments can still be made.

The transition from our current clients to the mass market is intended to be quick and smooth in order to start developing a strong brand identity for The Quito. These two segments (mass market and current clients) will have different objectives: for current clients, the goal is to properly integrate the product as a cross-selling opportunity for both current

and future clients (as a point of entry to our company); for the mass market, the goal is to build a digital presence through social media and the product's app.

These actions will be translated into quantitative goals. These include reaching at least 16,000 households (10% of our mid-term objective), especially among current Wise Control clients and national clients. We also aim to acquire at least 1000 new clients through The Quito who may require additional support with other pest issues.

In terms of the attractant, we aim to ensure that more than 60% of clients repurchase it, as this will indicate customer satisfaction and proper product performance. We also aim to expand sales across Europe, setting the goal of selling units in five different countries.

8.1.2. Mid-term objectives

From a mid- to long-term perspective, we aim to consolidate The Quito as a well-known solution for fighting mosquitoes among clients, competitors, and suppliers. We want to establish this product not only as an active solution but also as a source of preventive information to promote shared knowledge on mosquito prevention. This will position Wise Control as an innovative company with a strong commitment to environmental education.
Another major goal is to expand the geographical presence of the product, as the plague is spreading. The objective is to achieve nationwide presence for both current clients and the mass market. This expansion period will also be used to assess the possibility of entering more countries in the European market, which faces similar mosquito-related challenges.

In terms of quantitative objectives to measure the success of these processes, we aim to achieve a 3% market share in mosquito control in Spain. To estimate this share, we have used an estimate of plug-in domestic devices in Spain. On January 1st 2026, Spain had 19,75 million households and 49,57 million residents. OCU says that 78% use some anti-mosquito remedy at home, and among those users, more than a third use plug-in diffusers. If we consider that around 35% of households use these products, we get around 5.5 million households. **We aim to reach at least 3% of this market, which will lead to a goal of reaching 165,000 households.**

8.2. Marketing plan

The objective of this marketing plan is to successfully introduce The Quito into the domestic market. The plan will focus on the **mass market**, highlighting the product's innovative nature and how it differs from existing mosquito control solutions available in this segment. The marketing strategy will follow the Marketing Mix framework, emphasising product, price, distribution, and promotion.

8.2.1. Product

The Quito responds to a clear need identified in the market analysis: the domestic market lacks an efficient, non-toxic option that is properly integrated into the home. Current alternatives in the market have significant limitations regarding design, adaptability to household environments, and the use of a safe, innocuous attractant.

The two main functions of the product are prevention and capture. Prevention is achieved through the information provided to the customer via the app. The front-end of the app, or in other words, the user experience, includes tips for preventing mosquito proliferation, as well as an open forum with professionals who are part of the Mosquito Alert platform. The app will also include the option to set reminders for when the attractant needs to be replaced. The back-end, or internal functionality, will consist of a user database, product usage tracking, and stock management (especially for the attractants, as the app can notify users when they need to be replaced).
The capture functionality is based on the mechanical process by which mosquitoes are trapped: they are attracted by the attractant (chemical attraction) and water (natural attraction), enter the funnel, and become trapped inside the container. Finally, the customer can dispose of the water and replace the attractant, as none of the active ingredients is toxic. This product is unique and offers the possibility of expansion through a wide range of designs, colours, multi-unit options, and premium versions.

8.2.2. Pricing strategy

The strategy is based on a mixed model: the price of the product and the cost of the attractant.
Based on COGS and on pricing expectations (derived from the survey on customer validation, the cost for the consumer will be 14,99€, including one The Quito and two attractants, which ensure 2 months of protection. This provides an accessible positioning for the market, and this bundle will be a ready-to-use strategy as the consumer will feel convenience and willingness to try. Attractants will be sold in bundles, too:

- 2 units 4,99€
- 3 units 6,99€
- 5 units 9,99€

This model will ensure a constant revenue stream, especially during the high season. During the low season, prices will go down to incentivise purchase. Discounts will be between a 10% and a 20% of the original price.

The mentioned strategy is defined by searching for market penetration, as we have an accessible product to facilitate adoption. In the short term, margins are expected to be moderate, as increasing penetration volume and repetition will also increase, ensuring high returns directly impacted by volume.

Complementary strategy: bundles for companies. This strategy will be independently evaluated according to the client's needs by Wise Control's pest technicians. These bundles will have a discount; however, the discount will depend on the number of units required for each case.

Lastly, we rely on the 99 cents strategy, as the consumer will perceive the product as a bit more affordable. According to the survey, these prices fit within the willingness to pay of the surveyed individuals. According to the market, the average price of plug-in devices is between 5 and 6€, while devices that use the mechanism of The Quito can go up to between 100 and 150€. Our pricing is slightly higher than plug-in devices, but having all the added value that the Quito has when facing traditional methods.

8.2.3. Placement strategy

The distribution strategy will be set into two channels, the direct channel and the indirect channel.
In the short term, we will use the direct channel exclusively through direct selling to our current customers and online selling through our webpage and App. This very first step will be short, after being complemented by the indirect selling through marketplaces like Amazon, specialised shops in housing and gardening and lastly through sector distributors. The strategy in terms of geography, as previously mentioned, will follow a 3-phase expansion: metropolitan area of Barcelona, Mediterranean coast and national expansion. When developing these phases, it is key to highlight that logistics will use the same structure that comprehends externalised production and warehousing and direct shipping to the end client or to Wise Control (when the product is going to be served to a current customer).

8.2.4. Promotion

All the communication will be done around a clear value proposition: "**Effective mosquito control without toxins and adapted to household life**."

Communication channels will be directed, as the whole strategy, to two benchmark groups, essentially our current customers and the mass market.

Mass market-Digital Marketing plan
This plan will be the one focused on the mass market. For this reason, we will develop a digital communication strategy. On Instagram and TikTok, we will use a UGC creator strategy featuring small- to medium-sized creators who focus on organic content. For The Quito, we aim for the product to be included in UGC Lifestyle creators who show household

items, or cleaning routines, and they can fit the product into their routine. These influencers can also use their platform to spread tips and Ambiental prevention to promote our App.

To complement influencer visibility, we will also run online ads, especially Meta Ads, to promote our product on Instagram. These ads use cookies' information to define the profiles to whom our product is recommended.

Current client base

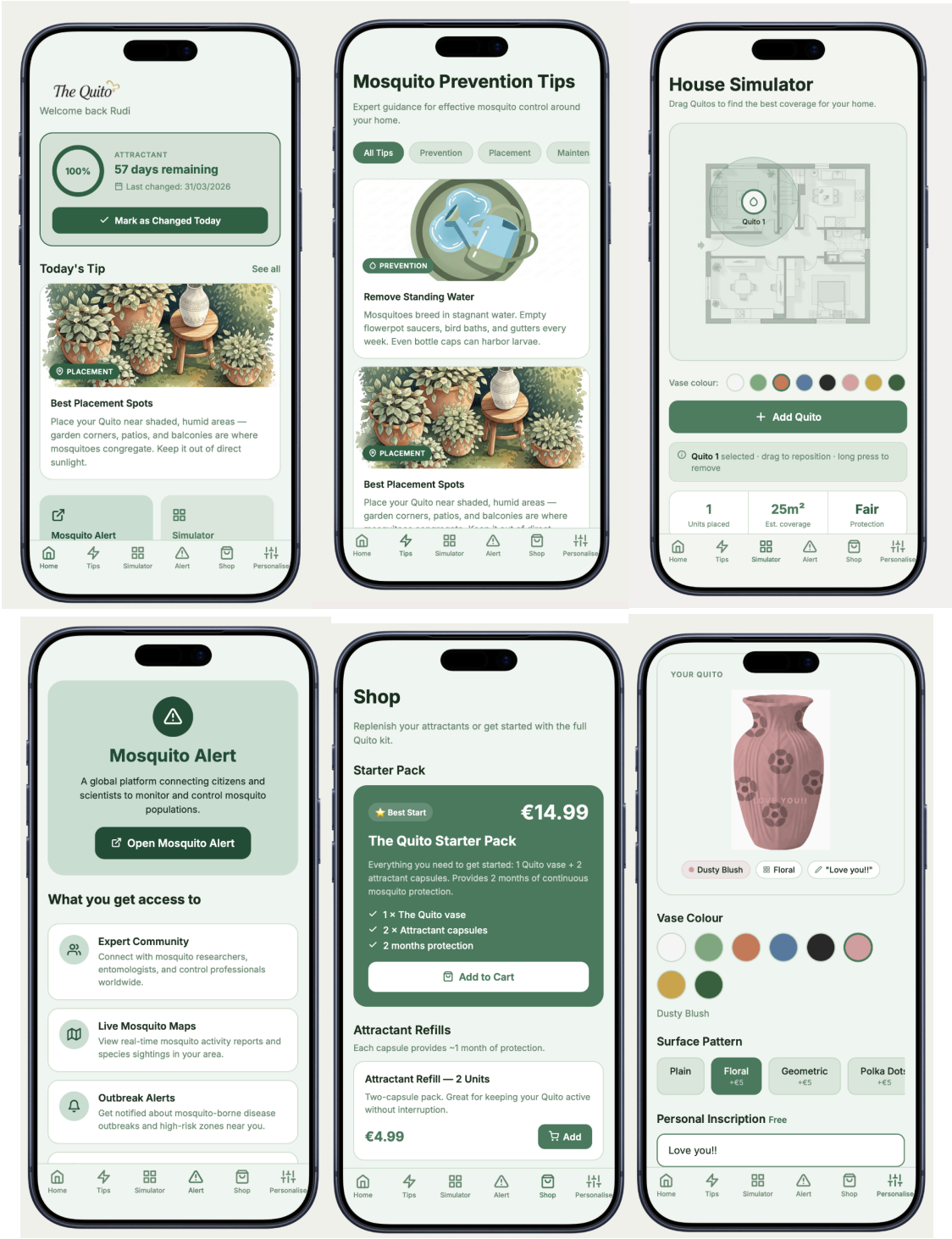
For our current client base, we will use email marketing to promote this innovation. Our current communication with clients (both professional and private) is mostly by mail, so we will send a newsletter to introduce The Quito. Complementary, we will use direct communication when visiting our clients. This will position the line to discuss the product and complement our current services. Our technicians will also demonstrate how the product works to reinforce trust with our client base. With bigger clients where our product can fit, like for example, restaurants, hospitals or hotels, a plan of action with different devices of The Quito will be presented to clients.

The Quito APP

Will be the communication strategy with our current customers. Through daily tips and information about new launches, we aim to keep the community engaged and secure. Also, there will be direct communication through Mosquito Alert, to be covered by experts and to collect information from our customers. More unique features can be found in the app, for example, a direct store to repurchase The Quitos and attractants, a personalisation zone to adapt the product better to the client's home and a simulator to set The Quito in strategic areas of the house.

Figure 19

Screenshots from The Quito App



The previous images are a simulation of how The Quito App would look and the features that it will have. Essentially, the App will have 6 different spaces to make the experience of using The Quito as complete as possible. The 6 spaces comprise:

- **Home:** Is the main panel where you can access all the spaces. The App will always greet the user (as seen in the first screenshot, “Welcome back Rudi”) to make it more personalised and closer to the customer, as a classic pest control service would be.
- **Tips:** Mosquito prevention tips is a space with daily tips to prevent mosquito proliferation. As highlighted by the interviewed experts, education about this topic is key to successfully controlling the species.
- **Simulator:** The house simulator will have very simple tools to register a house’s space information, and the objective is to place different Quitos and check their coverage in every customer’s house. The objective is to place them in strategic places and have an efficient display of Quitos.
- **Mosquito Alert:** This space is a direct communication tool with the regulated and official platform Mosquito Alert. Is an open forum with experts, alerts of proliferation focus and a double-sided information flow with the public administration. This is especially useful, not only for all the expertise the customer is getting, but also the public administration, which gets information registered by consumers. They can voluntarily share levels of infestation, areas more or less affected, current methodologies and their success. This tool is key, as it scales the pest control to the public administration with valuable information, as well as giving professional advice to our customers.
- **Shop:** All the packs and refills can be bought directly in this space. Also, special promotions will be applied during the low season in order to incentivize purchase.
- **Personalisation:** In order to make the Quito fit as much as possible in the customer’s home, there is an entire space dedicated to personalisation. Different colours, images, patterns, and even messages can make the device even more unique and special for our customers.

8.3. Operations plan

In the operations plan, the key actions to develop this project will be set. Different resources have to be aligned to be able to properly set the new business line for The Quito. The operations strategy will be divided into two paths: the initial operations configuration and the ongoing operation.

8.3.1. Initial configuration

This setting of operations corresponds to the initial phase of launching The Quito to the market. This phase has to be developed prior to the other phases to ensure a prepared launch.

Product development is the priority in the initial configuration. Once the design is done (which already is), it is key to recognise the key players in terms of delivering a product that reaches all our potential customers. For the “hardware” of our product, two production lines are set:

- **The vase:** The structure of our product will be entirely done in injected plastic, as this material does not disturb the normal behaviour of the insect, and this technique allows the mass production of the product. Our supplier will be Inplasor Galicia S.L., a Spanish manufacturer located in Galicia, which will develop the mould and be in charge of the production of the hardware of The Quito. In this stage, 20,000 units will be produced to align with our short-term objectives, plus some extra units to follow the contingency plan. Our supplier will ship the product to Sant Adrià de Besòs, where Wise Control Pest has its warehouse. This warehouse will be the centre of distribution and warehousing.

- **The attractant:** Our supplier will be, as it already is, for the rest of our operations, Killgerm. During the interview with our supplier, Josep suggested different alternatives for the attractant that they already have in their portfolio. Our attractant will be 0,98% Lactic acid base, as it is the active ingredient that can emulate the smell of human skin. The reference of the product is an attractant that they already sell, but adapting the shape and duration to our vase. BG-Mozzibait-1 is the main inspiration for our attractant, as the mechanism and activities are very similar. However, this attractant is designed to fit a BG device, which is way bigger than The Quito, as it is not designed for a home environment. The unitary cost for the attractant and shipment will be 2 euros.

On the other hand, the App has to be developed. This process will be done in parallel with the development of the actual product. The development of the app will be externalised and done by a freelancer. The development of the frontend and the backend will be followed by testing and a later launch. The frontend will be composed of the periodic mosquito prevention tips, the reminder of changing the attractant and a direct door with Mosquito Alert. Also, there will be a purchasing option to repurchase the attractants and a very simple simulator of your house, where you can virtually place and move the Quitos to figure out

how different spaces of the house are protected. The development of this app will be around 8000€.

Lastly, we will make sure to fit all the legal requirements that involve a product innovation. The legal revision of the product and the trademark registration will follow the usual procedure, as the product does not contain toxic materials, and it does not need to have any further registration or compliance. The last step of the legal aspects of the product is to ensure that the conditions of the online selling and the privacy policy of the app fit into the legal framework and are fair. For this step, we estimate a cost of 2000 euros, split between the trademark registration (between 200 and 300 euros in Spain), and the rest will be designated to legal advice for the product and conditions of the App.

In terms of marketing and commercial preparation, the first actions of UGC paid content will take place. The budget for these content creators is 30 small content creators will get the product for free, so the total cost will be 330€ for the company, and 10 medium content creators will be paid 200 per TikTok and story with the product. The total expenditure will be 2330€ on influencers, and the remaining 1670€ will be allocated to paid ads and boosting videos. From the 30 micro and small influencers, 20 will be Spanish (including profiles such as @clarasm.ugc and @martagrandeb) and 10 from other European countries (such as @jennywalshhh). The focus of these influencers has to be lifestyle, aesthetics and in some cases also sustainability.

8.3.2. Ongoing activities

These activities will be developed during the year and are separate actions from the initial preparation. These activities will be, in the first place, the production and inventory management. We will adjust the first forecast of 400 units during the first year in case our sales are significantly lower or higher than the set prediction. Inventory management will be supported by The Quito App, as we will have the right to date data on customer usage of the product, resulting especially useful for the attractant management. The re-stocking process will be figured out once we have analysed the sales of the first production.

Logistics is a key factor in ongoing activities as it will ensure that distribution is efficient and adjusted to the customer's expectations. Both of our suppliers will ship the final products to our warehouse, where the items will be packed and shipped to different parts of the country. The estimated shipping cost per unit will be 1€ as there is the possibility to partner with a logistics company to lower costs.

In terms of marketing, the ongoing activities are the management of our influencers and content creators, as well as the management of our own socials. For internal clients, the

Wise Control newsletter will have the main focus, as it ensures that our private and professional clients get specialised mosquito control prevention programs. Marketing will be done in-house and will not be externalised, at least, for a short-term view. The App maintenance is another source of current management; however, this activity will be outsourced (as previously mentioned), so the cost of this maintenance, updates and data management will have an approximate annual cost of 1000€.

Lastly, but crucial, customer service. This activity will be done by the social media team, the technicians and the commercial team, depending on which way our customers decide to reach us. In the App, there will be the company's contact and a guide with frequently asked questions, to provide customers with a fully transparent and confident experience with our company.

During the development of the ongoing operations, some KPIs will be closely followed to check whether we are aligned with our short-term objectives. Client satisfaction through online reviews, % repeat clients, and active App users will be the main KPIs to be analysed in the first year.

8.4. Contingency plan

The objective of the contingency plan is to identify the main risks that can threaten the development of our project and to define the necessary strategies to prevent and face them in case it is necessary. We are operating in a competitive market, so it is crucial that we get to anticipate future scenarios.

Market risks for this product are mainly two: that the acceptance of the product is lower than expected, and the entry of new competitors that duplicate this product.

The proposed strategy to face the lower acceptance is to pursue a high penetration trial. In the case that the market is reluctant to try this product, we will start by proposing a 2-week trial for our existing customers. After this trial, they can choose to buy or return The Quito. Given the effectiveness, we expect that a high percentage of clients will adopt the product. For the mass market, we aim to use a discount policy on the first purchase that also incentivises the purchase of the product, without affecting its profitability much.
For the entry of new competitors, in terms of costs, providing a much cheaper alternative is very hard, as our prices are already adjusted for mass selling. However, another stronger player could have more bargaining power with suppliers for producing at lower costs, so it would impact the final cost for the client. The strategy we propose is to build brand power through our socials and through our community. "The Quito" stamp on the vase is a synonym of being part of a community with instant contact with mosquito experts, and this

connection is complicated to replicate by our competitors. Moreover, our product will be entirely made in Spain and with high-quality plastic, which reinforces the decorative aspect of the product and gives a higher sensation of a premium product.

Operative risks include delays in production and problems with the logistic chain. We have chosen two suppliers that are trustworthy and a reference in their sector, but in case any step of our chain suffers any delay, we will have safety stock available in our warehouse. This stock will vary as our product progressively becomes more popular. Moreover, as our product is affected by seasonality, we will have clear contracts with suppliers that will demand extra coverage from April to October.

Technological risks can affect our App, and could affect the clients' perception of the product and its quality. We were already setting aside a part of the budget for app maintenance, so this risk is already covered and controlled by our external professional team. It is important that we set conditions (such as contracting a development company which can offer flexible working hours) to act as fast as possible if any error occurs.

Financial risks are the ones that have a greater impact and are the most difficult ones to prevent when an innovation is launched. Our strategy is based on a close following of financial ratios and KPIs during the first year, to adapt to the demand in the following periods. If we were facing lower selling rates than expected, the main focus would be to adjust demand and to cover the initial investment. As our business model is focused on both services and products, we would put the focus on compensating the initial investment by acquiring new clients on the services part of the business, by temporarily readjusting the business model. In the case that the product results in profitability and success, the initial investment would also be hard to cover by our own resources, so external financial aid would be used.

Lastly, in terms of legal risks, we identify that this product does not have high probabilities of being regulated differently than it is now (since it does not contain biocides). However, the attractant supplier has a legal team that takes a close look at regulatory changes and would send this information to us. We also have an external legal consulting group to make sure we do not face any legal risk.

To conclude, our strategy contingency plan will focus on prevention and flexibility by our suppliers and outsourced professionals, progressive scalability by reducing risks and by monitoring financial performance and by the use of existing resources, such as our staff and facilities, providing less uncertainty and initial investment.

8.5. Planning and financial projection

The Quito is part of Wise Control, as it is integrated into their business activity; however, financials will be evaluated separately as we will differentiate the product business unit from the service business unit. In financial terms, this project is based on a scalable and progressive model with a medium-term growth strategy driven mainly by the reinvestment of its own profits.

8.5.1. Revenue model and cost structure

The revenue model of The Quito is based on a dual income stream, where we have the income from the **sale of devices** and the **periodic purchase of attractants**. The starting bundle is priced at 14,99€ and includes one Quito and two attractants that provide protection for two months. This bundle aims to encourage product trial. If the client aims to buy additional attractants, there are three additional bundles: 2 units for 4,99€, 3 units for 6,99€ and 5 units for 9,99€.

To establish the revenue per client, we have developed an average based on consumer behaviour. Our baseline is that all of our clients will buy at least the starting bundle. On top, we estimate that 60% of our clients will purchase one extra attractant double pack, 25% will purchase one extra attractant double pack plus an extra Quito, and 15% will purchase 5 attractants and one extra device. This results in an average revenue per client of 24,73€

The cost structure will be differentiated both in variable and fixed costs. In terms of variable costs, it is considered the cost of producing the product, buying the attractant and shipping. The average unitary cost is 6€, which is divided into:

- Production and assembly of the plastic vase 3€
- Attractant 2€
- Shipping to our Warehouse 1€

This results in an average cost per client of 14,5€.

When considering fixed costs, the mold manufacturing will be 50,000€ for a steel mold that will run for 500,000 cycles. Also, a product manager will be hired to have someone with more experience in the field of manufacturing (30,000€/year salary with an approximate tax charge of 25,000). Finally, we will consider the costs for the warehouse. Although already covered by Wise Control Pest, the warehouse's yearly cost is 12,000€.

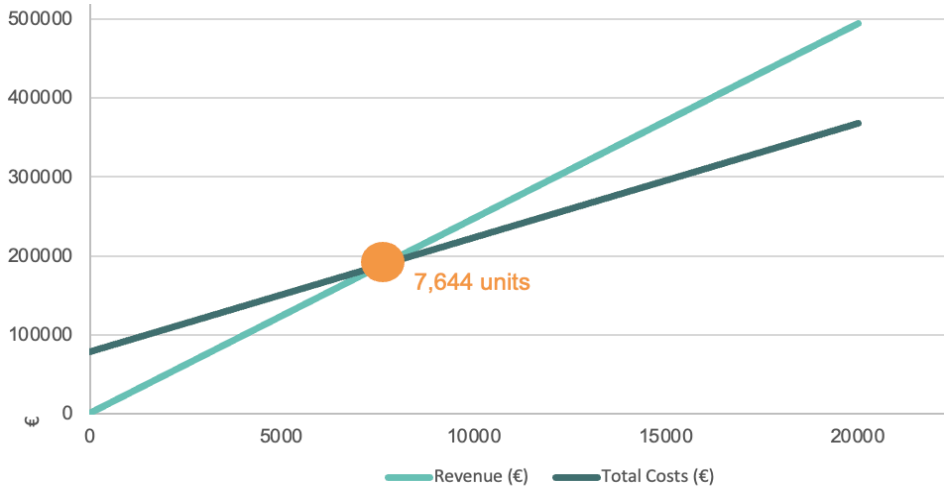
For the first year, most costs are actually investments (that will be analysed in the next chapter); however, as our model is based on progressive growth, we do expect to have fixed costs in the medium-term scenario. Some of these costs are, for example, hiring more people for the logistics team in our warehouse or the App and technological maintenance. Our model outsources the professional services we need for the project, but we do not have them in-house, which is why our cost structure mostly considers variable costs. Some fixed costs that respond to other essential assets for the project, such as the warehouse, the technicians, and the marketing team, are already in-house and are costs already covered by Wise Control Pest, but will still be considered as part of this project. The combination of average costs per client (14,5€/unit) and revenues (24,73€) leads to an average margin per customer of 10,23€.

8.5.2. Short-term projection

For short-term protection, we will consider the sale to 16000 households as the goal for the first year. This statement of profit and loss, balance sheet and cash flow show that we reached profitability in the first year and that the initial investment can progressively be recovered.
As it is detailed in the statements, we will reach profits soon. Also, the break-even point is reached in the first year:

Figure 20

Break-even point analysis



The contribution margin for the break-even analysis is 10,23€/unit. The fixed costs related to OPEX that are considered are salaries, warehouse, marketing, legal, depreciation and interests. The investment in the mold and the app was not considered as they are CAPEX.

Table 4

Profit and loss projection for a short-term goal

Short-term goal	16000 households	(€)
Total revenue	24,73€ following the average we stablished in the previous model	+395,680€
Total COGS	VARIABLE COSTS 14,5€ per unit, 16000 units. Includes product + attractants+ shipping	-232,000€
Gross profit		**163,680€**
Salaries	Wages + taxes	-50,000€
Warehouse	Rental	-12,000€
Other expenses	Marketing + Legal	-6,000€
EBITDA		**90,680€**
Total amortization	Steel mold that last up to 500,000 cycles. 50,000€/500,000 cycles= 0,1€/ unit. App development (amortization 5 years)	-3,200€
Loan interests	50,000€ loan 4% yearly interest	-2,000€
PROFIT BEFORE TAX		85,480€
Corporate tax (20%)		-17,096€
NET PROFIT		68,384€

Table 5

Cash flow statement per month (year 1 and 2)

Metric	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
Revenue (€)	23,741	23,741	23,741	39,568	39,568	39,568	39,568	39,568	39,568	39,568	23,741	23,741
Variable Costs (€)	-13,920	-13,920	-13,920	-23,200	-23,200	-23,200	-23,200	-23,200	-23,200	-23,200	-13,920	-13,920
Fixed OPEX (€)	-5,667	-5,667	-5,667	-5,667	-5,667	-5,667	-5,667	-5,667	-5,667	-5,667	-5,667	-5,667
Loan Inflow (€)	50,000	0	0	0	0	0	0	0	0	0	0	0
Parent Funding (€)	21,667	0	0	0	0	0	0	0	0	0	0	0
Mold CAPEX (€)	-50,000	0	0	0	0	0	0	0	0	0	0	0
App CAPEX (€)	-8,000	0	0	0	0	0	0	0	0	0	0	0
Safety Stock (€)	-58,000	0	0	0	0	0	0	0	0	0	0	0
Net Cash Flow (€)	-40,179	4,154	4,154	10,701	10,701	10,701	10,701	10,701	10,701	10,701	4,154	4,154
Cumulative Cash (€)	-40,179	-36,025	-31,871	-21,170	-10,469	232	10,933	21,634	32,335	43,036	47,190	51,344

M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24
59,352	59,352	59,352	98,920	98,920	98,920	98,920	98,920	98,920	98,920	59,352	59,352
-34,800	-34,800	-34,800	-58,000	-58,000	-58,000	-58,000	-58,000	-58,000	-58,000	-34,800	-34,800
-5,667	-5,667	-5,667	-5,667	-5,667	-5,667	-5,667	-5,667	-5,667	-5,667	-5,667	-5,667
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
18,885	18,885	18,885	35,253	35,253	35,253	35,253	35,253	35,253	35,253	18,885	18,885
70,229	89,114	107,999	143,252	178,505	213,758	249,011	284,264	319,517	354,770	373,655	392,540

We wanted to check whether this project can have difficulties regarding cash, which is why the statement is divided into months for the first two years. This 24-month monthly cash flow takes into account:

- €50,000 in loan received in the first month.
- €21,667 in additional funding provided by Wise Control Pest to cover the initial cash flow gap.
- Initial investment in molds (€50,000) and the app (€8,000) in the first month of the project.
- Initial purchase of 4,000 units of safety stock (€58,000), besides the variable costs regarding the units sold each month.
- The Quito is a seasonal product, so to estimate seasonal sales, the 70% are concentrated between April and October due to the high mosquito season, and the 30% is concentrated between November and March.
- We consider that the sales for the first year are of 16,000 units (as it is our first goal).
- We consider an estimation of sales of 40,000 units in year 2.

- Recurring fixed costs take into account salaries, warehouse, marketing and legal.

The main cash flow pain point occurs in month 1 due to CAPEX (especially due to the mold investment) and initial inventory, but once this point is passed, the business consistently generates positive cash flow and achieves a very solid cash position by the end of the second year. As we were expecting, it is a very scalable model.

Table 6

Short-term balance sheet

ASSETS	(€) 164,144	EQUITY AND LIABILITIES	(€) 164,144
NON-CURRENT ASSETS		NON-CURRENT LIABILITIES	
Mold	48,400€	Bank loan	50,000€
App	6,400€	CURRENT LIABILITIES	
CURRENT ASSETS		Taxes Payable	17,906€
Inventory (final year safety stock 4000uds)	58,000€	Other payables	6,187€
Cash	51,344€	TOTAL EQUITY	
		Initial Equity (Wise Control)	21,667 €
		Retained Earnings (allocation of NP)	68,384€

The Year 1 Balance Sheet reflects the last statement to evaluate The Quito project's profitability. For non-current assets, we have considered the net book value of the steel mold and the app investment. For current assets, we consider that inventory is the safety stock of 4000 units, and the cash is generated during the operations for the first year.

For liabilities, the company has acquired during the first year a long-term bank loan, which was partially used to finance the initial investment. Initial Wise Control Equity has also been used to cover the initial funding gap. Retained earnings correspond to the total Year 1 net profit, as in the short term, we have decided not to give dividends and reinvest them into the project.

8.5.3. Mid-term projection

The next big challenge is set in a mid-term projection, and it is to reach the 3% market share quota, which is represented by reaching 165,000 households. To give some oxygen to the challenge, we have a range from 3 years to 5 years to complete it; however, we estimate it will be completed in year 4 (16,000 units year 1, 40,000 units years 2 and 3 and 70,000 units year 4).

In the following profit and loss statement, we will evaluate the return for these 165,000 households. We highlight how, in the model, costs grow more slowly than revenues, and we end up with higher unitary profits as we grow the business.

Table 7

Mid-term Profit and Loss statement (year 4)

Mid-term goal	165000 households	(€)
Total revenue	24,73€ following the average we stablished in the previous model	+1,731,100€
COGS	14,5€ per unit, 165000 units. Includes product + attractants+ shipping	-1,015,000€
Gross profit		**716,100€**
Salaries	Wages + taxes	-150,000€
Warehouse	Rental	-12,000€
Other expenses	Marketing + Legal	-67,000€
EBITDA		**487,100€**
Total amortization	Steel mold that last up to 500,000 cycles. 50,000€/500,000 cycles= 0,1€/ unit. App development (amortization 5 years) + new app development (5 years)	-5,000€
Loan interests	50,000€ loan 4% yearly interest	-2,000€
PROFIT BEFORE TAX		480,100€
Corporate tax (20%)		-96,020€
NET PROFIT		384,080€

Table 8

Balance sheet for mid-term projection

ASSETS	(€) 1,206,364	EQUITY AND LIABILITIES	(€)1,206,364
NON-CURRENT ASSETS		NON-CURRENT LIABILITIES	
Mold	43,600€	Bank loan	50,000€
App (Original and new development)	8,800€	CURRENT LIABILITIES	
CURRENT ASSETS		Taxes Payables and other liabilities	142,433 €
Inventory (final year safety stock 4000uds)	58,000€	TOTAL EQUITY	
		Initial Equity (Wise Control)	21,667 €
Cash	1,095,964€	Retained Earnings (allocation of NP)	992,264€

To calculate the accumulated cash, we have followed the expected selling units per year, as well as the generated cash per year. The same goes for the allocation of NP into retained earnings.

From the financial statements, we can conclude that the model has an asset-light structure and provides lots of financial flexibility as it is highly scalable. It is financially sustainable and offers low risk. The progressive reinvestment makes the company grow organically while being stable, and does not require much initial investment, as some of the key elements for the development of this project are already in-house assets.

8.6. Budget and investment

The initial budget will be the result of the required operations to start our economic activity in year one. This investment is thought to achieve the first objective: sell 16,000 units. If we exceed expectations, more investment will be required. The total initial investment will be 63,980€ to commercialise these 16,000 units. The breakdown of the investment is:

Table 9

Initial investment and costs

Investment		(€)
Product Development & Production	Mold manufacturing (Inplasor Galicia S.L.) for 500,000 cycles	50,000
Technology Development	App development (frontend + backend + testing)	8,000
Marketing	30 micro creators (product cost)	330
Marketing	10 mid-tier creators (paid collaborations)	2,000
Marketing	Paid ads to boost socials	1,670
Legal & Administration	Trademark registration	300
Legal & Administration	Legal consulting (product + app policies)	1,700
TOTAL		**63,980 €**

With this first investment and initial costs, we are capable of launching the first 16000-unit production, which is aligned with our short-term objective. Also, we are developing the App, which is a differentiating element, and we are activating the digital marketing strategy for the beginning, creating hype and excitement around our product.

As our break-even point is located at 7,644 units, our business model is very scalable. If we work with a slightly negative scenario or a slightly positive scenario, we would still have profits for our first year. The return on investment will always be positive as long as we surpass 7,644 units and the investment sticks to the budget. Our project achieves profitability in the first year under the expected sales scenario.

For a mid-term investment scenario, we will evaluate how profitable the second goal to achieve is, selling 165,000 units. For this goal, we set a 3 to 5-year time margin. The following table evaluates the needed investment to cover this second goal:

Table 10

Mid-term investment and costs

Investment		(€)
Technology Development	App development	9,000€
Technology Development	App maintenance	3,000€
Marketing Budget	Adds and influencers	50,000€
Logistics team	Hiring two extra staff and increasing shipping cost budget.	100,000€
Legal & Administration	Legal consulting (product + app policies)	5,000€
TOTAL		**167,500€**

Extra resources will be searched when reaching higher sales to perfect the business and keep growing. We will invest more in marketing and social media, and app development to add extra features. Also, the team will grow, as the business grows.

The model is progressively scalable, so for the midterm strategy, we will reinvest our profits as an increase in sales. In the case of fast business acceleration or the need for extra financial help, we will reach external financing. With the subsidies of the European Union for innovation and sustainability, we could reach financing at a lower cost. Some examples are the subsidies like Pyme innova from the Spanish Cámara de Comercio or the subsidies by InnoFin from the European Investment Bank and the European Commission.

The final conclusion for the investment and financing forecast is that the Quito project has a lower financial barrier, especially with the source of financing of Wise Control Pest and low-interest subsidies and loans that are targeted to innovative small and medium companies. Also, being scalable makes the investment progressive and feasible to manage; its early profitability makes the project growth based on the reinvestment of profits, making it a low-risk project.

9. Conclusions

The development of The Quito project has demonstrated that there is a clear opportunity in the market of domestic mosquito control, and this opportunity is expanding in parallel with the expansion of these vectors. The lack of domestic solutions that are both effective and non-toxic or without the heavy reliance on heavy chemical actives, has been demonstrated to be the main pain point in the current market.

The analysis conducted over the behaviour and expansion of this pest has been key to framing the problem. Climate change, urbanisation, or globalisation are inputs that have a very strong impact on the proliferation of invasive species such as the *Aedes albopictus*, which has installed a new epidemiological paradigm in countries such as Spain. This scenario is about to expand to colder areas such as the north of Europe. In this context, we identify a lack in the market for domestic mosquito control: current solutions are not adapted to the private environment in terms of functionality, aesthetics and tradeoff between effectiveness and low toxic impact. The Quito has been developed as an innovation to solve this gap. By analysing the market and contrasting the proposal with experts on the industry, we have developed a product that addresses this issue from different perspectives, such as the mechanical capture of ejemplares, integrated design with a non-toxic active substance and environmental education through preventive information. This innovation is not only a product, but it is a 360º proposal to address the mosquito issue.

From a strategic perspective, it is remarkable that this product will be integrated as a subdivision within the existing company, Wise Control Pest. This is a key fact to guarantee its success as it lowers barriers of entry (by addressing current customers and validating the product in a real environment) and benefits from already existing assets of the company, such as staff, know-how, or infrastructure. In combination with the operations strategy, we are proposing a scalable and flexible model that ensures organic growth. The externalisation of the production and of the technological development, as well as the in-house marketing development, and the technicians' team, ensures risk minimisation while being capable of progressively growing the business and its profitability.

From the financial point of view, the initial required investment is low and can be financed by the main company. Moreover, the break-even point occurs in the early stages of the project and, if the objectives are reached, benefits will be obtained from the first year. When evaluating mid-term objectives, and considering a more grown and mature business, we have faced projections that highlight a controlled financial risk and increasing profitability per unit sold.

To reach the proposed numbers, we aim to penetrate the market by a digital media strategy and a community-building strategy through Wise Control and through the app. We aim to consolidate ourselves as a referent brand that is supported by professionals in the industry who also contribute to The Quito community.

To conclude, The Quito aims to be positioned as an innovative solution that addresses a health issue that is rapidly expanding, while being completely adapted to the client and the household's needs. This solution is viable, scalable and features a scientific approach to face a global incipient problem.

We present a sustainable business model that can go wherever mosquitoes go.

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11. Appendices

Interview 1- José Ferreira Álvarez

Muchas gracias por acceder a hacer la entrevista. Esto es para mi trabajo de final de grado, que estoy desarrollando un producto para la expansión de nuestra empresa. Quiero hacer esta entrevista para poder validar contigo el producto en sí.

Y ver desde un punto de vista más profesional qué insights me puedes dar para la validación. Queremos validar la necesidad del producto, la viabilidad técnica, la propuesta de valor y el encaje en el mercado, desde la perspectiva de un profesional en el sector de las plagas. Vamos a empezar por el contexto profesional.

Quiero que me expliques brevemente cuál es tu experiencia en el sector, a qué tipo de clientes atiendes principalmente, si son hogares, empresas, administración pública, y que te presentes un poco. Hola, soy José Ferreira Álvarez, soy responsable técnico de Wise Control Pest. Y un poquito resumiendo, la mayor parte de los clientes que tenemos en la empresa suelen ser particulares y pequeñas empresas, pero también tenemos empresas más grandes del sector de química alimentaria y farmacéutica, que son las empresas más potentes dentro del sector.

¿Requieren de nuestros servicios? Sí, aparte están obligados. ¿Y tu experiencia? Yo en el sector de plagas urbanas llevo desde agosto del 2003, o sea, unos 23 años más o menos, y en el sector fitosanitario unos 35 aproximadamente. Son muy diferentes, aunque son plagas igual, una cosa es salud vegetal, que es un mundo completamente diferente, que hay otros factores que no tienen nada que ver con los factores que nos encontramos en salud ambiental, que para entendernos salud ambiental incluye todo lo que son espacios más humanizados, casas, restaurantes, empresas... A diferencia del fitosanitario, que hace todos cartiles particulares, pues está más dedicado a lo que es agricultura, control profesional en bosque y otro tipo de plagas.

Muy bien. Y la última pregunta del primer bloque ya es centrada en el producto que yo quiero desarrollar, que es un producto para el control de mosquitos. Quería tener una perspectiva de qué peso tiene el control de mosquitos dentro de tu actividad profesional o de la que has performado en el pasado.

El tema de los mosquitos es un tema complicado, porque es una plaga que está en expansión, ya no solamente por el mosquito común que conocemos nosotros, el *Culex pipiens*, que es el que hemos tenido toda la vida, sino por las nuevas especies que están entrando, sobre todo de la familia de Aedes, del género Aedes, perdón, que es el mosquito tigre, la Desalopictus, y ahora está entrando también el mosquito egipcio. Son mosquitos que su presa habitual serían los humanos, a diferencia de nuestro mosquito de toda la vida, que su presa habitual, por llamarlo de alguna manera, serían las aves. El mosquito común nuestro mayoritariamente pica aves y el mosquito tigre pica humanos.

A diferencia de lo que la gente pueda pensar, nuestro mosquito de toda la vida, su mayor porcentaje de picadas es en aves. Transmiten diferentes enfermedades, pero las enfermedades que transmiten el mosquito común estamos un poco ya más adaptados a ellas y ahora poco a poco nos están entrando enfermedades como dengue, que en España no lo teníamos y ahora podemos tener como autóctono. Hay casos muy esporádicos, pero ya tenemos también fiebre del Nilo, que también hay que tenerlo muy en cuenta y ya ha habido algunos casos de muerte por fiebre del Nilo en Andalucía, sobre todo donde hay más problemas.

El tema de mosquitos es muy complicado, son complicados de tratar, porque a veces tenemos que tratar mosquitos sobre vegetales que no sirven de alimento, como por ejemplo últimamente arrozales, pues claro, entran en muchos factores el riesgo de que no haya intoxicaciones a personas por los productos que se aplican sobre mosquitos y el mosquito, sobre todo el mosquito tigre, que es lo que más tenemos relacionado con nosotros, que lo tenemos en nuestro día a día, se reproduce en muy poquita agua, no necesitan demasiadas exigencias a la hora de reproducirse y con el cambio climático, pues bueno, empiezan a aparecer antes y desaparecen más tarde y la verdad es que es un problema. Vale, muchas gracias. Y desde su experiencia, aparte de todo el problema en torno a sus arrozales, si lo llevamos a un entorno doméstico, ¿cómo valorarías el problema? Bueno, pues es un poco extrapolarlo al entorno doméstico, pero el problema es que cada vez hay más problemas de plaga, sobre todo ahora con el mosquito tigre, porque es un mosquito que está muy relacionado con ambientes urbanizados, o sea, necesita mucho de los humanos, primero porque somos su principal presa, por decirlo de alguna manera, porque no es depredador nuestro, para que nos entendamos, y bueno, y cada vez está más en expansión, por lo tanto, eso lo extrapolamos a un ambiente urbano y nos encontramos lo mismo, o en una casa, en un domicilio, cada vez tenemos más problemas, igual tú tienes

todo bien recogido, que no haya puntos de agua para que se reproduzcan, pero si tu vecino al lado tiene, pues es como si todas las medidas que has adoptado para poder controlar esta plaga no sirven de mucho, la verdad.

Entonces nos encontramos con el mismo problema, cada vez más especies de mosquitos, con cada vez más incidencia, se alarga más en el tiempo la presencia de ese mosquito, y eso es lo que se traduce en que al final hay más picada dentro del domicilio. ¿Entonces se podría afirmar que los hogares gestionan de manera no adecuada la plaga? Por ejemplo, con mosquitos tigres, sí, no quiero generalizar, pero aunque se hagan campañas sobre el tema de fiestas, que no se dejen platos, o si se riega, que se pongan boca abajo, cuando llueve, que no queden los jardines, sobre todo cualquier objeto que pueda acumular, el agua que cabe en un verdal, que es muy difícil, entre que es muy difícil, la gente no está demasiado concienciada, piensan que haciendo ese tipo de actos no van a conseguir nada. Sí que es cierto que muchas veces cuando hacemos campañas nos encontramos que no se está gestionando de manera adecuada.

¿Por qué considera que tan pocos hogares contratan servicios profesionales para el control de estos mosquitos? Porque realmente los productos y los sistemas que tenemos en el mercado no son del todo eficaz. Entonces, bueno, hay mucha gente que se gastaría mucho dinero en un servicio que funcionase, pero cuando lo llevas a la práctica se dan cuenta de que no está funcionando como ellos quisieran ni como nosotros quisiéramos. Entonces el principal problema es ese.

Ya no es una cuestión económica, que no sería, porque habría gente que no se lo podría costear, pero la gente que se puede costear no tiene resultado tampoco, por lo menos el resultado que todos quisiésemos. Vale. Genial.

Ok, pues pasamos justamente al tercer bloque, que son las limitaciones de las soluciones actuales, que es lo que estamos hablando. Entonces me gustaría saber cuáles son las principales limitaciones de los productos domésticos actuales para el control de mosquitos. Por ejemplo, desde los aparatos que se enchufan a la luz, hasta Mosquiter, hasta Citronella... Sé que son muy diferentes, pero... Bueno, a ver, aquí hay que diferenciar diferentes productos.

Los productos refelentes, los productos atrayentes con captura y los biocidas, propiamente dicho. Que es un producto químico que tiene un principio activo que mata al insecto. Aquí tenemos, en el mercado hay una amplia gama para mosquitos de todos.

¿Qué funciona? Hay unos que funcionan mejor y otros que funcionan peor. Normalmente los que están funcionando son los que tienen un componente biocida, un principio activo, un compuesto químico que tiene un principio activo, suele ser un pitetroide, hipermetrina, opermetrina, o deptametrina, en un porcentaje, en principio, no demasiado tóxico, por decirlo de alguna manera. Las toxicidades las podemos catalogar de otra forma.

Se tienen que catalogar de otra forma. Para personas, pero bueno, que no dejan de tener una toxicidad. Si tú tiras un Raid y no lo sabes tirar, puedes coger un broncopam y puedes tener un susto.

Hay gente que, incluso ha habido gente que ha tenido problemas de movilidad porque afecta al sistema nervioso. Entonces, hay que tener cuidado. Hay que tener cuidado porque hay mucha gente que piensa que porque ponga uso doméstico en un bote se puede tirar de cualquier manera y en el bote no especifica cómo se tendría que se tendría que especificar cómo se tiene que aplicar de manera correcta y no lo pone.

Entonces, son los productos que mejor funcionan. Luego tenemos los repelentes tipo citronela. Hay gente que dice que le funciona. Yo si alguien me dice que algo le funciona pues perfecto, que no lo toque. Pero realmente, científicamente hablando, en un exterior, por ejemplo, donde tenemos problemas en jardines, en un exterior, gente que se va a la piscina, la citronela, pues como que en un ambiente cerrado ya tiene bastantes limitaciones por no decir que es bastante ineficaz por lo menos por experiencia personal en un espacio abierto no tiene ningún sentido. Hablamos de repelentes como tal.

Luego tenemos los atrayentes, perdona, luego tenemos los repelentes que se ponen en el cuerpo, los que venden en los supermercados. Bueno, hay un montón de estudios. Hace poco, hace un par de años, pues un chico se echó el mejor repelente que dicen que venden en el mercado y se le posaron tres mosquitos tiros encima.

Entonces, claro, el tema de repelentes es complicado. Luego, tema de atrayentes, también tenemos varios tenemos varios productos en el mercado. Atrayentes con captura puede

ser una trampa, un aparato de luz ultravioleta con un adhesivo en el cual se queda enganchado el insecto.

Sobre todo funciona de noche, que es cuando la luz es más hay más contraste de luz, de luminosidad. Pero claro, durante el día, que es cuando el mosquito tigre está más activo, a diferencia del mosquito común, que ataca más de noche, tiene sus limitaciones también. Aparte de todas las limitaciones que puede tener a nivel logístico, a nivel de colocarlo en un domicilio, que es un poco engorroso.

Y luego también tenemos los aparatos profesionales, dispositivos profesionales, que se basan en unos atrayentes que imitan un poco el CO2 humano, con algún olor característico y bueno, entran en una especie de molinillo, entran en un nudo de red y se quedan enganchados. ¿Funcionan? Sí, funcionan muy bien, porque tienen hay capturas, pero no podemos evitar que haya picadas antes de que el animal sea capturado. Entonces, las veces que los hemos colocado en exteriores, pues han funcionado de manera regular.

O sea, sí que funcionan porque capturan, pero el efecto que quiere el cliente, que es que no le piquen o que le piquen lo mínimo posible, depende cómo no es del todo efectivo. Y luego tenemos los biocidas, que es lo que mejor funciona. Tenemos que tener en cuenta el factor toxicidad, por un lado, que hay un riesgo, y sea de uso doméstico o de uso profesional, y que hay que ser muy constante con el tema de las aplicaciones.

O sea, no se aplica una vez y te olvidas. Tienes que ponerme de manera regular, en caso de que sea el típico kill bug de toda la vida, que se enchufa, pues los recambios tienen que ir cambiando, y tienes que estar aplicando de manera regular. En el ambiente, es el biocida de manera regular, porque en cuanto dejas de aplicar, y más en un ambiente digamos en un volumen de aire, en cuanto dejas de aplicar y abres una ventana, ese aire se lava, y el producto se disipa, y automáticamente deja de tener la dosis letal, la concentración letal que necesitamos para que ese animal muera, en cuanto entra el aire, ya se diluye y vuelve a entrar automáticamente.

Y luego tenemos otro factor que no he comentado, que son las medidas físicas. Las medidas físicas son las mosquiteras de toda la vida. Eso es lo que mejor funciona, porque si no tienen paso no pasan.

Pero funcionan dentro del hogar. En un jardín no puedes poner mosquiteras evidentemente, entonces si el sitio es abierto es complicado. Muchas gracias.

Vale, pues vamos a pasar a el prototipo que yo presento que estoy intentando desarrollar. Te lo explico y ahora lo comentamos. Entonces, el prototipo que yo quiero desarrollar mezcla un poco o intenta coger las características más positivas de los diferentes tipos de control de mosquito. Por una parte tendríamos que es atrayente, ni repele como la citronela ni bueno, no deja paso, sino que atrae. Es un dispositivo que está pensado para dentro del hogar. Entonces, también he considerado que era muy importante, por ejemplo, las barreras físicas que hemos comentado que son tan eficaces muchas veces no se ponen porque no quedan bonitas en casa y la gente la descarta por eso, porque en una ventana ponerla no gusta una mosquitera. Entonces, también mezclar el tema de la eficacia con que sea un elemento decorativo del hogar y que sea más atractivo para estar en una casa.

Entonces, he desarrollado una forma de jarrón. Ese es el primer prototipo, pero bueno aún hay que darle una vuelta, podría ser un jarrón, podría ser cualquier forma. Entonces, funciona a través de un mecanismo de embudo con un atrayente y pues quedarían los mosquitos atrapados en agua que habría abajo.

Entonces, hice una validación cuantitativa de un de un survey a más de 100 personas y sobre todo vi que la preocupación principal de los hogares sería la toxicidad del producto, es decir, que no sea tóxico. Ya hemos hablado, pues, la mayoría de familias lo han probado, pero también a la mayoría de familias es lo que más les preocupa, que sea un producto químico. Entonces, en este caso, este no lo sería, porque sería un atrayente como el que hemos hablado, estilo CO2.

Vale, una vez presentado el concepto del producto, quiero saber desde un punto de vista técnico, aunque ya lo hemos hablado, ¿cómo considera de viable este sistema de captura? Bueno, que ya lo hemos mencionado más o menos, pero... Vale, bien. A ver, este tema de el prototipo que has diseñado en principio es genial y me gusta mucho. La verdad es que la idea la encuentro genial.

Primero porque es un diseño que puede quedar bien en cualquier sitio, aunque se puede cambiar el modelo, se puede cambiar el diseño sin ningún problema. Este, por ejemplo, que también me gusta, se puede poner en cualquier parte del hogar. El que no tenga

productos químicos en principio es muy buena idea y aparte cada vez la gente quiere menos productos químicos, que se apliquen menos o que tengan menos toxicidad.

Yo lo que veo es un pro y un contra en este diseño. El pro que encuentro, esto es lo que he comentado ahora mismo, que no tiene principios activos, no tiene productos químicos, que es un diseño bonito, que se puede aplicar en todos sitios, pero como te he mencionado anteriormente, lo más efectivo que hay contra mosquitos, aparte de las barreras físicas y de tomar las medidas del agua y de que no haya puntos de agua y tal, son los productos químicos. Por lo tanto, aquí tenemos un problema.

El problema está en que por una parte, cada vez más las personas quieren un producto que funcione sin químicos y por otra parte, tenemos un insecto que la manera más eficaz de tratarlo es con químicos. La parte negativa que yo veo de este sistema es que necesitamos un buen atrayente, porque la idea es muy buena de intentar que el atrayente sea más potente o por lo menos igual del atrayente de un ser humano, de todo lo que exhalamos, que los mosquitos se rigen cuando nos detectan y nos pican por temperatura, por CO2, por emisión de CO2, por temperatura, por el sudor. Si encontramos un atrayente que fuera más potente o por lo menos lo más parecido o igual a lo que nosotros exhalamos cuando dormimos o cuando estamos despiertos o durante el día con los mosquitos tigres, pues la verdad es que la idea es genial.

El problema que tendría es que hay que encontrar ese tipo de atrayente. Habría que hacer un trabajo de investigación para encontrar un atrayente que de manera pasiva, colocándolo en un carpucho como tú lo tienes diseñado, tenga la capacidad de que si te levantas a la cama en vez de colocar un flipad y matar todo lo que tengamos en la habitación y la toxicidad que eso conlleva hacia la persona, porque te estás intoxicando aunque no te des síntomas, estás respirando como una pilotroide, aunque sean cantidades muy bajas. La intoxicación está aunque síntomas no te den.

Me parece perfecto eliminar lo que es el flipad de toda la vida, que es lo que mejor está funcionando por este tipo de producto. Eso es súper positivo. Lo único negativo que veo es que habría que hacer un trabajo de investigación muy potente para encontrar el atrayente ideal.

Ya hemos valorado el producto en sí. Ahora pasamos a cómo encaja con el modelo de negocio, ya que quiero que hablemos directamente desde la empresa, porque al final estoy

desarrollando el producto para implementarlo en la empresa. Entonces, mi idea, aparte de desarrollar un producto que se venda al mass market, al público general, también es un poco incluirlo dentro de la actividad de la empresa, porque hemos detectado que controlamos muchos tipos de plagas diferentes, cocarachas, ratones, tal, pero de mosquitos, como hemos dicho antes, casi nadie contrata estos servicios.

Sin embargo, es un problema creciente y es una plaga muy molesta en verano y en la validación cuantitativa la mayoría de gente se situaba en un nivel de estrés de medio a muy alto en verano respecto a los mosquitos. Sobre todo si somos de la cuenca del Mediterráneo especialmente. Entonces, quería saber si ves viable este producto como complemento al servicio profesional que damos, especialmente a los clientes particulares, porque ya hemos comentado que en los profesionales hay unos tipos de trampas que ya funcionan pero faltaría como hacer un tipo de trampa similar pero adaptado al entorno doméstico.

Entonces, ¿tú crees que este producto podría ser un buen complemento a los servicios que ya prestamos? Sí, yo creo que el producto sería un muy buen complemento. Como he dicho antes, habría que investigar sobre el tema de la trayente para encontrar la trayente de manera pasiva, sin tener que calentar y sin tener que nos suponga un quebradero de cabeza para el usuario que ahora tengo que enchufar o desenchufar, que de manera pasiva fuera capaz de atraer mosquitos y que la probabilidad de que haya picado dentro del hogar sea la misma posible si fuéramos capaces de encontrar este atrayente o varios atrayentes, varios productos que mezclados fueran capaces de atraer los mosquitos hacia la trampa la verdad es que sería genial porque yo estoy convencido de que la gente lo compraría si fuera efectivo y meterlo en el mercado al gran público para que lo pudieran tener en casa yo creo que sería todo un éxito siempre y cuando, insisto, el tema del atrayente fuera el ideal Vale, genial y también a nivel de modelo de negocio planteaba usar este producto como un complemento a los servicios que ya damos poner una casa que tiene servicio contratado de cucarachas pues también en los meses de verano presentar esta alternativa para el control de mosquitos pero también consideré la opción de que también sea una puerta de entrada a los servicios que ofrecemos, es decir que al comprar este producto entres en contacto con nuestra empresa y en el caso de que el cliente tenga otro problema nos llamen a nosotros ¿Crees que este producto podría atraer a nuevos clientes a la empresa? Totalmente, sí porque si el producto finalmente funcionase muchas veces tenemos bueno, nos pasa de las dos vertientes tenemos clientes que llevan muchos años con nosotros que

nos están diciendo oye, ¿qué podemos hacer con los mosquitos? y ya tenemos con ellos con todas las cucarachas ratas, hormigas y tal y luego tenemos otros clientes que nos llevan para mosquitos vas a hacer la inspección, le dices lo que se puede hacer, el grado de efectividad que puede tener, le explicas todo y te dicen y es que aparte tengo esto Entonces sí que es el tema de poder potenciar un producto contra mosquitos que funcione y la gente lo asocie a que tu empresa tiene un producto que realmente está funcionando para mosquitos y se puede aplicar dentro del hogar sin ningún problema sin tener que enchufar, sin tener que poner ningún tipo de ventilador activar ningún tipo de ventilador que es totalmente pasivo Yo estoy convencido que ampliaría el negocio en otras plagas, no tiene nada que ver con esto Vale, genial Pues vamos al último bloque que será muy cortito y es bueno, supongo que me vas a decir lo mismo pero respecto al producto ¿qué aspectos mejorarías? y ¿qué riesgos debería considerar a la hora de implementar este producto en el mercado? es decir, un poco lo quiero ligar con el plan de contención ¿qué cosas pueden ir mal para poderlas prever de antes y adaptar el diseño o tener en cuenta Bueno, empezamos por lo malo, lo que puede ir mal es que el atrayente no funcione o sea, si el atrayente no funciona será un fracaso o sea, no tendrá salida al mercado, lo comprará la gente porque la gente que está desesperada prueba todo, entonces lo probarían por desespero pero tendría un recorrido muy corto si realmente lo prueban, se gastan el dinero y no funciona, pues igual que el boca a boca puede hacer que sea todo un éxito el boca a boca puede hacer que sea un fracaso eso es lo negativo que yo veo de de implantarlo en el mercado y lo positivo es todo lo demás un diseño atractivo aunque personalmente me gusta mucho como te he dicho antes, no requiere de tener que enchufar, sería totalmente pasivo depende de la duración del atrayente sería simplemente sacar la parte superior del producto, quitar un cartuchito y meter otro o sea, no va enchufado la luz no hay que cambiar bombillas no hay que hacer mantenimiento de un ventilador que hace de succión para coger mosquitos como en otras trampas que tenemos de uso profesional o sea, sería lo más cómodo si fuera afectivo, sería lo más cómodo para un cliente, no le puedes pedir más Genial pues hasta aquí sería la entrevista Muchísimas gracias

Interview 2- Josep Parnau

Bueno, lo primero era que te presentaras un poco, o sea, que si me quieres hablar un pelín de tu experiencia, genial. Sí, pues la primera parte sería explicar un pelín sobre tu experiencia en el sector de las plagas, qué posición tienes actualmente, así más en general.

Vale, pues nada, como ya hemos dicho, bueno, mi nombre es Josep Parnau, represento el Departamento Técnico en una empresa denominada Killgerm, que tiene sede en Inglaterra y después delegaciones en muchos países de Europa y presencia a nivel mundial a través de algunos productos en particular, como son los insectocutores para el control de insectos. Dentro del Departamento Técnico de Kilchern en España, yo representaría al director técnico. He estado en la empresa en los últimos 21 años. Tengo una licenciatura en bioquímica, primer grado de biología, segundo de bioquímica. Estuve unos años trabajando en investigación en España y en el extranjero y, bueno, finalmente aterricé en plagas hace 20-21 años y ahí he estado. Y en paralelo, bueno, me he sacado lo que es el grado de Administración y Dirección de empresas.

Dentro de lo que es Kilchern, es una empresa distribuidora pura y dura, o sea, compramos y vendemos, tenemos algo de fabricación y uno de los puntos fuertes de la empresa es que intentamos dar mucha formación técnica, que aquí yo tendría pues un papel un poco importante. Al final, o sea, vendemos a un sector muy técnico porque nos dirigimos específicamente a lo que es empresa profesional, pero es un sector muy técnico y, claro, se tiene que dar mucho soporte. Aquí es donde entra mi departamento y el departamento del grupo, que hay muchos técnicos, y en función del país se hacen muchas formaciones. Esto ya va en relación a los requerimientos particulares de cada país.

Por ejemplo, en Inglaterra la formación queda arreglada y tiene valor. En España la formación que damos es, bueno, más para dar conocimiento, para enseñar productos, pero después no tiene un valor legal en cuanto a acreditación.

Vale, genial. Bueno, mira, ya hemos tachado otro punto que tenía para preguntarte, que es el tipo de clientes que atendéis principalmente, que son empresas.

Sí, nosotros somos una empresa profesional y con esto somos muy estrictos. Empresa profesional de plagas es que tenga ROES, que es el registro en sanidad, y también podemos tener algunos clientes que sean administración, ayuntamientos, algún centro de investigación, pero lo que es particular no lo tocamos para nada.

Vale, genial, perfecto. Pues ya entrando un pelín más en tu actividad y la actividad de Killherm también, mi objetivo en esta entrevista es entender, de parte también un poco de la demanda de las empresas, cómo está ahora mismo el momento producto de mosquitos, para poder testar un poco la viabilidad de mi producto, la demanda, etc. Entonces, para

empezar, vamos a ir un poco de genérico a más específico. Quería primero saber, dentro de los productos que vendéis, también las asesorías que hacéis y tal, un poco el volumen respecto a las plagas, o sea, ¿qué plagas dirías que tienen más representatividad dentro de vuestra actividad y cuáles son más residuales?

A ver, nuestro sector se denomina el DDD, que es desinsectación, o sea, control de insectos, derratización, control de roedores y desinfección, lo que serían microorganismos. De estos grupos, los insectos y los roedores son los más importantes. En porcentaje no te sabría decir números, pero insectos y roedores más o menos sería lo mismo, y es, digamos, el grueso de nuestras ventas, lo que realmente acaba pagando nuestros sueldos.

La D de desinfección siempre se ha dicho que es como una D pequeñita, y de hecho es un mercado muy ignorado y que las empresas profesionales de plagas, por lo general, no realizan y lo dejan a las empresas de limpieza, que es una pena porque legalmente los trabajos de desinfección, cuando se hacen a terceros, requieren una empresa profesional que esté registrada en sanidad, y lo acaban haciendo las empresas de limpieza que legalmente no lo pueden hacer. Cuando hubo lo del COVID, ¿qué pasó? De repente las empresas de plagas todas despertaron porque dieron mucho dinero, que en parte es un poco, yo lo encontré un poco triste en el sentido de que como si nos estuviéramos aprovechando, y en ese momento sí que las empresas se volcaron a hacer desinfecciones, hubo empresas que ganaron mucho dinero, lo cual yo no encuentro del todo justo, y claro, ¿qué pasó? El COVID, puntualmente la alarma desapareció y la desinfección, que puntualmente fue bastante grande en cuanto a facturación, ha vuelto a desaparecer y lo vuelven a ignorar por completo. Si después ya vamos específicamente a lo que son insectos y relacionado con el control de mosquitos, podemos decir que el control de mosquitos en cuanto a facturación dentro de los insectos igual representaría un 15% o un 10%, no creo que mucho más.

Son números que los tenemos que coger un poco con piezas porque no tengo estudios que nos den datos totalmente fiables, pero dentro de la facturación global que tenemos nosotros no creo ni que lleguemos al 5% en cuanto a facturación que nos dé el mosquito.

De acuerdo. Vale, genial. Sí, esta era una de las primeras premisas de mi trabajo, que es que la plaga de los mosquitos no se explota ni tampoco se controla profesionalmente, que es la primera hipótesis de mi trabajo, que es que el control de mosquitos a nivel doméstico no es como el control de otras especies, como por ejemplo las cucarachas, que muchas

veces sí que se contratan empresas para hacer este control, sino que es simplemente el usuario que va a comprarse una vela de citronela. Veía un patrón de consumo diferente y un patrón de comportamiento respecto a la plaga diferente, entonces también un poco el análisis va por ahí. Vale, genial.

Otra de las hipótesis de las líneas de investigación de mi trabajo es que los mosquitos, pese a no ser una gran fuente de facturación para las plagas, es una plaga que va en incremental debido al cambio climático y tal, entonces quería saber si has observado este crecimiento en demanda de productos o simplemente es algo que se habla mucho pero no...

No, hay un incremento y esto va bastante asociado, se crea lo que es el cambio climático. Va en aumento en el sentido de que en los últimos 20 años ha habido brotes de enfermedades asociadas a los mosquitos en Europa. Esto podemos decir que en el último periodo del siglo XX los mosquitos, al menos en Europa, dejaron de transmitir enfermedades.

Claro, en el momento que no representan un peligro en el sentido de provocar enfermedades o incluso de provocar muerte, el mosquito deja de ser como una plaga de relevancia sanitaria. Sí que es y ha sido siempre una plaga que ha causado molestias simplemente porque pica, pero sí que en los últimos 20 años hemos visto un incremento de brotes en distintos países de Europa y estos brotes asociados a muertes. En los últimos años, así como ejemplos muy cercanos, en el sur de España hemos tenido brotes del virus del Nilo, que es una enfermedad que transmite el cúlex, que es el mosquito común, y que va asociado a lo que son aves.

Ha habido transmisiones de la población en los últimos años y ha habido una mortalidad baja, pero que ha habido gente que ha muerto. Cuando esto sucede saltan las alarmas y la demanda de control de mosquitos incrementa mucho.

De acuerdo. Y dentro de la demanda de los productos y de las soluciones que ofrecéis vosotros, ¿qué dirías que son los productos que más se demandan?

Sí, hay muchas opciones y pasa que aquí entra la técnica y lo que es la normativa. Aquí podemos encontrar un poco de todo. Antes me mencionabas que tu sensación era que, por ejemplo, en el mosquito podría ser que no hubiera tanta demanda de lo que es el

particular en cuanto a contratar empresas de plagas y que simplemente se van al supermercado a comprar alguna de ellas o cualquier producto de esta tipología.

Demanda hay. Quizás si lo comparamos con cucarachas, la cucaracha es un mercado más amplio porque la cucaracha genera más rechazo. Va asociado como que da un poco de asco, hace más suciedad.

Uno lo asocia a una probabilidad más alta de transmisión de enfermedades. En cambio, el mosquito siempre se ha visto como el que me pica y me molesta, pero aquí se queda la cosa. No genera este rechazo de que es una cosa sucia.

Pero demanda la hay, claro. Frente a la demanda, ¿qué se puede hacer? Primero es la tipología de demandas.

Normalmente, cuando un cliente pide una solución, quiere una solución total, un control total, y que se haga lo que sea, cualquier cosa. Que se fumiguen sus exteriores, que se pongan en contacto con los ayuntamientos para que fumiguen toda la población, etcétera. Aquí debemos mirar qué técnicas tenemos asociadas a las demandas y hasta qué punto debemos ofrecer solución a ciertas demandas.

Por ejemplo, cuando hay un brote, enseguida tenemos muchas llamadas y la gente exige una solución total y que debemos fumigar a nivel poblacional. Y que se tiene que hacer lo que haga falta, claro. Aquí debemos partir del punto de que si en un momento dado el mosquito solo está dando problemas de picaduras, el hecho de hacer tratamientos poblacionales se debería descartar siempre, porque es peor la solución que el problema.

O sea, una picada te va a molestar, pero si yo te evito la picada porque hago pulverizaciones en exteriores, el producto químico que se estará echando y que mate al mosquito tampoco es bueno para las personas. Y si realmente el perjuicio es solo picadas, no se deberían hacer estos tratamientos. Y de hecho, estos tratamientos están totalmente prohibidos en toda Europa.

O sea, lo que es aplicación química de adulticidas en exteriores, o sea, lo que son insecticidas que matan el mosquito adulto, es totalmente prohibido, porque en la Unión Europea se entiende que se genera un perjuicio más elevado que lo que se acaba solventando. Cuando uno explica esto, a la gente le cuesta mucho entenderlo, porque ellos

ven que el mosquito pica, para ellos ya es un inconveniente suficiente, y no se percatan del riesgo de los productos químicos. Hay gente que sí, que después está muy contentiada, que estos productos pueden generar unos perjuicios, etc.

Pero muchas otras personas no. Aparte de que a veces hay la visión de que si un producto afecta a un mosquito, pues es como inocuo a las personas. Y esto no es así.

O sea, cualquier producto que afecte a un insecto nos va a provocar algún daño a las personas. Cuando menciono esto, siempre les hago ver que yo, que soy quien doy la explicación, parte de mi sueldo lo pagan los insecticidas. O sea, que en este sentido no me estoy inventando nada, porque de cierto modo me estoy echando piedras a mí mismo.

Pero aquí la pregunta es, cuando hay un brote y ya tenemos transmisión de enfermedades, tampoco se puede hacer nada. Aquí después se abren lo que son usos especiales. En determinadas situaciones, en lugares muy concretos y en periodos de tiempo muy determinados, y para actores muy concretos, se permiten hacer actuaciones que en general no se podrían realizar.

Serían principalmente estos tratamientos adulticidas, que tampoco se hacen totalmente a ciegas. Previamente se tiene que hacer una evaluación de la situación, determinar las zonas que se deben tratar, cómo hacerlo. Después se hacen los tratamientos, se hace un análisis de cómo ha ido y después se repite o no en función del resultado que se ha obtenido.

Claro, volviendo más al inicio y dejando aparte lo que son estos brotes que a veces suceden, que tampoco suceden, pero no es el día a día. Son brotes puntuales. En una situación normal debemos partir de los productos adulticidas totalmente descartados.

¿Qué podemos hacer? Las empresas de control de plagas, cuando reciben consultas para hacer actuaciones frente a mosquitos, una buena actuación primero pasaría para dar una formación de cosas previas a realizar para minimizar que pueda haber mosquitos en la zona. Esto está siempre como que la vegetación se mantenga limpia, que no haya acúmulos de agua descuidados, que al final es donde criarán los mosquitos, porque esto es muy típico de un particular que se queja de mosquitos y te pide que hagas ahí un tratamiento adulticida.

Vas y después te encuentras que tiene ahí cubos de agua totalmente descuidados, te utiliza para regar y el mismo cliente se está generando los mosquitos y no se da cuenta. Y a partir de aquí las actuaciones que se pueden hacer pasa por el trampeo, que son trampas que originalmente salieron en mercado para monitorizar, pero que ahora han ido evolucionando para la captura y son trampas que funcionan muy bien. Y a nivel químico lo que sí que estaría permitido son los tratamientos de los cubos de agua para matar larvas.

Y aquí básicamente estamos hablando de dos tipologías de productos. Una sería las siliconas biodegradables, que son unos productos que se echan encima del agua, generan una película y evitan que la larva pueda respirar y esta muere. Se considera que no genera perjuicio en el medio ambiente.

De todos modos, al menos en Killgerm, estos productos solamente los recomendamos en aguas que sean urbanas, que no estén en zona rural. Y en lo que sería ya zona rural, parques naturales, lo que sí que se hace y se utiliza a toneladas sin exagerar, es un producto que es una bacteria que se denomina Bacillus y es una bacteria que genera una toxina que afecta exclusivamente a la larva de mosquito. Y de hecho en todos los parques naturales se utiliza a toneladas, o sea en grandes cantidades.

Y esta es la razón por la cual cuando vamos a visitar un humedal no hay mosquitos.
He intentado hacer un resumen un poco así rapidito de todas las estrategias que habría. No sé si me he dejado alguna, lo que sí que tengo curiosidad es para ver tu producto.
Porque por un lado tenemos la técnica y por el otro lado tenemos la legislación. Y de hecho, que es una cosa que repito mucho, como hemos dicho al principio, yo represento el departamento técnico, pero yo como tal no me presento ya como el director general del departamento técnico, como el responsable. Me identifico más como que soy parte del departamento legal.

Porque cuando recibo consultas de ¿puedo hacer esto o lo otro para este problemazo? O ¿qué debería hacer para atajar este problema? Yo siempre les digo, mira, a nivel técnico habría esto, pero vamos a ver qué dice la normativa. Y es lo que yo te podría recomendar. Y después la normativa es lo que manda realmente.

Genial, pues si quieres te lo cuento un poco a ver qué te parece. Vale. Ahora por el chat te puedo enviar una foto, pero te lo explico primero.

Yo quería desarrollar una trampa para la gestión doméstica. Y porque al final la empresa de mi padre, tratamos con empresas grandes, pero yo quería un poco como focalizarme en los clientes más pequeños, porque a nivel de rentabilidad son los que son menos rentables. Entonces quería como un complemento a su ya actual plan de plagas.

Y pensé que los mosquitos era lo más interesante, porque también eso tiene muchas implicaciones a nivel salud de las personas, molestan mucho, pero yo siento como que nadie acaba de hacer nada, bueno, es lo que hemos hablado. Y básicamente es un jarrón decorativo, que también tiene la parte de que es una trampa que es bonita, no parece una trampa, entonces se adapta un poco a la vida de las casas. Y bueno, quiero desarrollar como una línea de diferentes estilos y tal.

Y es básicamente un jarrón que tiene un embudo para capturar los mosquitos con un atrayente. Entonces la parte del atrayente sé que es la más compleja, porque tiene que ser un atrayente que funcione. Y en eso estoy.

Pero ese sería el mecanismo sencillo, y abajo tendría agua para que al final se ahogaran en el agua y poderlos desechar fácil. Esa era mi idea.

Vale, te explico. Esto después yo te lo puedo compartir, igual te puede venir bien para el trabajo. Después a nivel de diseño de tu trampa, el hecho de que tenga agua, ya solo con agua, sin hacer nada más, vas a atraer a las hembras. A las hembras que se denominan grávidas, que quiere decir que están, la palabra técnica no será correcta, pero como si fueran las que estarían embarazadas.

Porque van a buscar agua donde depositar los huevos. Este tipo de trampa se denomina trampa de ovoposición. O sea, trampa donde ir a poner los huevos.

Y el atrayente simplemente es agua. Y a veces se pone un poco de hierbas para simular el medio natural, pero con esto sería suficiente para que fuera. Si tú haces una entrada cónica y dificultas un poco la salida, se debería probar y sería fácil determinarlo.

Pero últimamente, a veces estas trampas simplemente lo que después se hace es poner alguna tabla adhesiva para que el mosquito que ha entrado ya no tanto que se acabe ahogando, sino que acabe tocando la tabla adhesiva y ahí se queda pegado. Lo que es el atrayente, esto sí que está bien pensado y ayudaría a lo que es a la atracción. Normalmente

entonces lo que conseguiríamos es también atraer las hembras que buscan picar, ¿de acuerdo?

O sea, cubrirías más todo el rango de hembras a traer, porque principalmente lo que nos interesa capturar son las hembras y estas trampas al final lo que acaban atrayendo son las hembras que son las que pican. El atrayente, los que hay en la actualidad, se basan en simular el olor corporal. Y aquí te encuentras que están formulados en base a acido láctico, urea, ponen compuestos como el octanol. No son atrayentes muy complejos de formular, pero la verdad es que hay pocos en el mercado, pocos o te podría decir solo uno, que esté correctamente registrado y que esté funcionando bien.

Y de hecho este, por los conocimientos que tengo, hay otras trampas que han llegado a acuerdos con el fabricante para poder utilizar sus trampas. Y a partir de aquí, las trampas en general, el modo como funcionan, suelen tener, todas ellas en general, un pequeño ventilador que genera un flujo de aire para que este aire se impregne de este atrayente, acaba saliendo por algún lugar, que suele ser una superficie plana un poco, digamos, grande, no tiene que ser enorme, pero un poco grande, para que simule como una piel. Y el mosquito se acerca pensando que hay una piel a picar, o sea, que es una persona o un animal.

Y lo otro que se utiliza para atraer es el CO2, porque el CO2 lo emitimos al respirar, y es para simular la respiración. Y para simular CO2 hay distintas formas. Una bombona de CO2, simplemente, y el oseco, que es CO2.

Hay trampas que utilizan la combustión, butano o propano, y es una combustión. Y después la otra estrategia pasa que es a corto plazo, cuando se utiliza es la fermentación. Agua y azúcar y con levadura para que fermente. Pasa que esto genera CO2 dos o tres días, no más, porque después se agota.

Pero la idea de hacer una trampa, digamos, no es nueva. Hay muchas tipologías y después lo típico. Ahora todo tiene que ser telemático y conectarse y hacer treinta mil cosas.

Pero la idea de una trampa, si está bien diseñada, a un precio correcto y con una buena distribución, el potencial es muy grande. Es muy grande. Actualmente, en Europa, la principal marca, la que creo yo que tiene más ventaja, es una marca que se denomina Biogents.

Esto no es problema. De hecho, es la marca que nosotros comercializamos y es de las que tiene más éxito. De hecho, por ejemplo, cuando ahora ha habido estos problemas en Andalucía con lo del virus del Nilo, los protocolos que se han sacado a través de la administración y a través de las empresas de control de plagas, en general siempre llevan lo que son las trampas de la marca Biogents. Y ya se utiliza el nombre de algunas de ellas como si fuera, digamos, un referente en el sector.

Pues muchas gracias, súper interesante. Sobre todo lo que me has contado tengo un par de cosas que te quiero preguntar. Vale. El punto, que es muy importante, del precio de trampa, que hemos hecho un precio… Estas tipologías de trampas, ¿qué precios suelen rondar? Entiendo que estás hablando para empresas, o sea, B2B.

El tema comercial es muy complejo, es muy complejo. Con las trampas Biogents, por ejemplo, nos hemos encontrado con la situación que las mismas que nosotros vendemos para profesionales y que inicialmente solo se dirigían a profesionales, puntualmente el fabricante ha decidido que quiere ir a comercializarlas en el mercado doméstico, que tampoco fue una novedad porque ya lo intentaron en el pasado, pero fue un desastre porque como requiere un poco de conocimiento técnico lo pusieron en algunos mercados en concreto, la gente no los utilizaba bien y después se devolvían y, bueno, fue un fracaso comercial. Pero claro, esta empresa lo quiere volver a intentar porque al final el mercado de mayor tamaño es el doméstico.

Claro, te puedes encontrar que la misma trampa que está vendiendo un profesional y una trampa que originalmente estaba pensada solo para profesionales la acabas encontrando para doméstico en Amazon más barata que al precio comercial.

Interview 3- Tomás Montalbo

Vale, genial. Doncs, si vols, comencem. Primer, moltes gràcies per fer l'entrevista.

No, home. Mil gràcies. Vaig trobar el teu pare el dijous.

Sí, m'ho va dir. Dijous, sí, sí, estava fent una formació.

Molt bé, molt bé, doncs escolta, el que necessitis tu dispara i anem fent.

Súper. Primer de tot, si et podries presentar breument, una mica la teva trajectòria...

Jo soc Tomàs Montalbo, jo treballo a l'Agència de Salut Pública des del 2003. Soc biòleg, ornitòleg i entomòleg. Vaig començar aquí al Servei de Vigilància i Control de Plagues Urbanes que pertany a l'Agència de Salut Pública de Barcelona en el marc de fer un manual de gestió integrada de plagues a equipaments municipals. Abans tenia la competència de la via pública de control de plagues, però van acollir els propers 800 equipaments municipals i calia fer un manual. Llavors vaig entrar en aquest encàrrec i a partir d'aquí he desenvolupat la meva activitat sobretot en la línia de la vigilància de malalties transmeses per vectors i reservoris i això inclou des de Rates, a Panaroles, a Gaviants, Coloms... i des del 2004 a Mosquits, que és la part que porto des de l'inici a un protocol específic d'atenció a herbovirus i transmeses pels mosquits i a la vigilància o control que es fa a la ciutat amb diferents eines.

I actualment ara ja vaig passar... això era tècnic superior i des de fa dos anys estic de cap de servei d'aquest Servei de Vigilància i Control de Plagues Urbanes.

Súper, moltes gràcies. El meu projecte es centra més en el tema de mosquits i volia entendre una mica la tendència d'aquesta plaga, l'afectació sobretot a l'àrea metropolitana de Barcelona però també a Espanya en general i també la tendència. La primera hipòtesi del meu treball és que la tendència dels mosquits és creixent pel canvi climàtic cada cop hi ha més àrees que són afectibles per a ells per poder viure i reproduir-se i volia saber una mica en quin estat està la plaga actualment.

Doncs són plagues que es consideren emergents. Quan parlem de mosquit tigre estem parlant d'una espècie exòtica invasora però ja no només el mosquit tigre sinó altres espècies exòtiques invasores que són del gènere edes també que tenen molt potencial invasor i que algunes també les tenim a la península com l'edes japonicus que està al nord d'Espanya i hi ha d'altres que tot i no tenir-les a la península sí que la tenim molt confinada a les Canàries que és l'edes aegipti que és el mosquit de la zoera droga. Podríem dir que els edins, els exòtics invasors són les grans amenaces que tenim actualment a nivell de mosquits. Algunes consolidades com el mosquit tigre, el 2005 a Barcelona, el 2004 a Sant Cugat del Vallès això ha fet un procés d'expansió en principi tot al litoral mediterrani però ha anat avançant en aquells espais on té condicions com per establir-se. De manera que a

nivell de riscos és un dels factors més importants a nivell de salut pública donat que és vector competent pel dengue, zika i xungunya. Abans del 2004 no teníem aquesta situació.

Tot teníem protocols d'atenció d'aquests casos importants perquè no teníem un vector competent i això ens canvia l'escenari epidemiològic a nivell de molèsties perquè és un mosquit que s'ha desenvolupat a l'exterior de manera que terrasses, jardins, patis exteriors pateixen molt la seva presència i per tant la ciutadania es veu molt afectada. I per un tema de risc de malalties. Això generalitzat a la península.

I després tenim un altre mosquit que és el mosquit que hem tingut sempre, que és el mosquit oepip que també és un mosquit bastant bé representat a nivell de la península perquè bàsicament cria en aigües estancades i amb unes condicions de seguretat deficients llavors tots els canals d'arreg, piscines abandonades, abocaments d'aigua que no s'han gestionat correctament doncs poden ser focus i això ens acaba afectant. Que també l'efecte era molt relacionat amb la picada i amb la convivència en el vector però des d'allà fa podríem dir 10 anys van començar a aparèixer casos d'una malaltia endèmica que tenim a la península que és el virus del nilo ocental. Això ha estat molt afectat al sud d'Espanya, a Andalusia i a Extremadura principalment amb bastanta mortalitat associada, cosa que agraeix més la situació.

I aquí a Catalunya també tenim transmissió però els casos humans estan més retinguts. He tingut 3 casos humans a Catalunya, contra Andalusia són centenars de casos els que han tingut amb diversos morts. De manera que l'escenari a nivell de plaga, el mosquit comú també és bastant rellevant i cada vegada podríem dir que les dues estan agafant una importància manifesta en la tensió que s'ha de donar des del punt de vista de controlar les molèsties i controlar la transmissió de malalties.

D'acord, gràcies. I donada la perillositat de la plaga i també la molèstia que produeix, actualment quines mesures s'estan prenent per poder controlar-la? Hi ha algun tipus de mesures que són molt transversals relacionades amb el sistema de salut.

La possible transmissió de malalties és un cas que preocupa i ocupa les comunitats autònomes que tenen les competències transferides, de manera que hi ha protocols específics per donar atenció als casos importats que s'arriben de Dengue, Zika, Chikungunya o els casos que hi ha de West Nile, per atendre aquell cas específicament.

Des del punt de vista de vigilància i control vectorial, però també epidemiològic, és a dir, en el seu conjunt. De manera que això normalment es fa en tots els territoris que hi ha mosquits tigre o mosquit comú per donar atenció a aquest tipus de casos. I són les comunitats autònomes les que vinculitzen com a atendre aquest tipus de casos.

Això seria la part, podríem dir, més epidemiològica. La part de les molèsties és competència municipal als mosquits. Llavors, cada municipi hauria de tenir un pla de vigilància i control als mosquits.

I això és depenent una mica dels recursos que té el municipi i de la problemàtica. Aquest equilibri entre quin problema es genera i quin recurs li dono és el que es valora en els municipis per tal de donar resposta. Llavors, municipis que tenen molta problemàtica i són grans i tenen recursos, tenen un programa molt més desenvolupat que d'altres que són petites poblacions que tenen problemes puntuals i tenen un contracte molt menor per donar resposta.

Però si parlem del marc que hauria de tenir un programa de vigilància i control, hauria d'estar fonamentat en la prevenció. Això és la base de tot. És a dir, prevenció és el punt de vista d'informació al ciutadà sobre les mesures que ha d'aplicar a casa seva per evitar tenir focus de proliferació dels mosquits i una part de sensibilització ciutadana amb xerrades, tríptics, material divulgatiu pròpiament, que pot ser complementat amb una part de tallors educatius en centres escolars.

Això també ho fem a la ciutat de Barcelona. I també processos de porta a porta. Aquí tenim un projecte a Barcelona que es diu A casa teva i informadors ambientals visiten les zones més problemàtiques de la ciutat per informar el ciutadà de què ha de fer al seu jardí, a la seva terrassa, per evitar tenir mosquits.

Això seria la part de la prevenció. Molt adreçada al ciutadà i al disseny d'estructures que a la ciutat condicionen que hi hagi mosquits. Per exemple, aquesta part de prevenció a la ciutat la fem modificant amb burnals que poden acumular aigua, participant en el disseny per tal de reduir aquest tipus de focus.

En els dos àmbits s'han d'equilibrar les mesures que s'implementen des del punt de vista de la prevenció. Després ha d'haver-hi una part de vigilància del mèdic. S'ha de tenir una cartografia de l'àmbit competencial que té el municipi, que és la via pública, i en aquesta

cartografia s'han d'identificar tots els elements que poden tenir aigua per evitar que siguin focus.

I això el que es fa és fer una vigilància d'aquests elements amb una freqüència mensual durant el període d'activitat del mosquit, que va ser de l'abril al novembre actualment. El canvi climàtic segurament això ens farà canviar, i per això també és important que aquesta vigilància inclogui un monitoratge del vector durant tot l'any per veure quan comença i quan acaba la seva activitat, perquè els nostres programes aniran condicionats per aquest inici i aquest final. L'important és tenir identificats aquests focus que comentava per tal de fer una planificació de visites en caràcter mensual en les diferents zones on has detectat que pots tenir problemàtica perquè tens possibles focus de proliferació, ja siguin embordals, siguin fons o siguin petits elements que acumulen aigua.

Això seria una part de vigilància estructural que lluny de la prevenció hauria de ser el 70% d'un programa, perquè l'altre 30% hauria de ser el control. És a dir, què fem quan tenim un problema? Hem d'actuar, hem d'actuar amb mesures de control que aquí on hi ha els mosquits es prioritza molt que siguin biològiques, que siguin larvicides. S'intenta mitjançar aquesta prevenció, aquesta vigilància, arribar quan comença el cicle larvari, perquè el cicle larvari aquàtic és molt més fàcil de tractar amb productes i molt més efectiu que si els mosquits ja els tenim en vol.

Llavors, gran part de la feina que fem, podríem dir que el 95% de les aplicacions que fem a la ciutat les fem amb larvicides biològics que no tenen cap tipus d'impacte sobre el medi ambient ni sobre la salut de les persones. Però a vegades ens passa que arribem molt tard a alguna situació, ja sigui un cas importat d'herbovirosis, o sigui una zona de vigilància que per la temperatura, per les condicions climàtiques, ha proliferat molt i ha avançat molt ràpid el cicle i trobem molts mosquits adults que estan produint moltes incidències ciutadanes. Llavors allà sí que fem una actuació adulticida, sempre amb molta comunicació amb el gestor de l'espai, el districte, en aquest cas, Parcs i Jardins, Barcelona Cicle A l'Aigua o Serveis de Neteja, per intentar ser els més efectius possibles en la intervenció i tenir la mínima deriva de producte que pugui ocasionar problemes secundaris.

Dins del programa també, a més d'aquest control, incorporem la Ciència Ciutadana, és a dir, una plataforma que es diu Mosquito Alert, que està liderada per el CEAP de Blanes, el CSIC també, i que és una plataforma que estudia els mosquits invasors i els mosquits

autòctons d'aquí. Permet enviar comunicacions d'adults o de focus de cria. Llavors això va a un mapa públic que serveix per a models predictius.

Nosaltres incorporem la informació que comunica el ciutadà dins del nostre programa d'urgència i control perquè és molt difícil conèixer tot el que passa a la ciutat. Llavors qualsevol informació que proporcionen és molt viable per a la millora dels nostres programes. I per últim també el que fem és incorporar, mitjançant una plataforma de comunicació d'incidències de l'Ajuntament, totes les queixes, incidències o comunicacions que fan els ciutadans relacionades amb mosquits.

Evidentment contactem amb la persona, anem a fer una inspecció i en funció d'una inspecció fem el tractament que sigui més adient. Això seria el conjunt del programa que actuem. D'acord, gràcies.

Em dóna més visió perquè la trampa que jo estava desenvolupant és per ús domèstic. Ah, bé. Sí, i clar, m'estava focalitzant molt més en el fet de capturar els mosquits però també seria molt important poder-ho combinar amb una mica d'educació ambiental cap al client.

Correcte, és a dir, nosaltres utilitzem moltes tipologies de trampes. Les trampes ens ajuden per diferents coses. Una, per conèixer l'estacionalitat del mosquit, és a dir, el canvi climàtic que està afectant el nombre de setmanes d'activitat del mosquit comú i del mosquit tigre i això condicionarà a l'inici el tancament de programes d'atenció.

Llavors això ens serveix molt, són trampes VG Sentinel que són de captura d'adults i ens permet aquesta particularitat de poder disposar dels ejemplars, que també poden servir per fer altres estudis de genètica o de virus. I aquestes trampes també serveixen per quan tenim un problema poder avaluar-ho. Quan diuen, ah, és que tenim un problema aquí molt enquistat en què hi ha molts mosquits i tal, per dimensionar-lo localment també serveix, no? I sobretot serveix per avaluar.

Jo quan faig una intervenció a l'herbicida, a l'adulticida, en un lloc que per vigilància he vist que s'ha disparat i que hi ha molta presència, faig un tractament, com avaluo que ha estat efectiu? Doncs col·loco una trampa abans i després del tractament i amb això comparo i veig si he controlat el problema o no. És a dir, les trampes tenen diferents utilitats. Una altra utilitat que se li està donant és posar-les en propietats privades per fer un mass trapping, que es diu.

És una captura massiva, es col·loca en un pati, compres dues trampes veges, les col·loques a dues cantonades que compleixin criteri d'ecològica en l'espècie i allò va capturant i va reduint la població. Nosaltres no ho recomanem perquè la millor manera és fer una bona prevenció i reduir els focus de criat per no tenir mosquits, però què passa en una ciutat gran? Que tu potser al teu pati ho fas molt bé, però al teu veí no. Molta gent se la col·loca i redueix bastant la pressió de mosquits a la zona perquè vas capturant i són mosquits que no tens en l'ambient i per tant no et picaran.

Aquesta és una de les utilitats que el sector privat o el sector de providors de serveis estan oferint molt a les cases quan ells pels seus propis mitjans en aquell espai no poden solucionar el problema. El mosquit tigre li agrada la foscor, li agrada que tingui uns elements d'atracció determinats com són els exudats de la pell que es tradueix en àcid làctic i altres components.

Els repel·lents ambientals no deixen de ser biocides, però en una concentració no arriba a ser-ho. Llavors, el que es fa és crear un apantallament que et provoca aquesta repulsió. De fet, hi ha alguns productes al mercat que s'estan utilitzant així, que és... Ostres, mira.

No, ja no ho tinc per aquí. Tenia una mostra d'un producte que s'està una mica esclat ara. El Blum, no sé què.

I aquest producte, si tu vas a sopar al jardí, fas una rodona 10 minuts abans i això té una persistència d'uns 3 hores que actua com a repel·lent. D'acord. I això s'està desenvolupant molt per hotels, per... Jo no he vist cap producte encara al mercat, però sé uns difusors que cada cert temps deixen anar producte per crear aquest halo de protecció.

D'acord. Jo he explorat més la part dels atraients, perquè suposo que és el que més s'utilitza actualment. Bueno, per les trampes, sí, clar.

Sí. És a dir, que els atraients funcionen molt bé,. Està fonamentat en els sudats de la pell, això sí, però exactament quina és la composició no... Tot i que ho posa, eh, però clar, les proporcions i tot, no t'ho posen mai al complet. Clar. Per protegir la fórmula, no? Clar, clar, clar, la fórmula, sí, sí.

Clar, un lurer val 30 euros. 25 euros. És molt car

És a dir, si tu utilitzes trampes veges, has d'utilitzar lurer. I això... És a dir, tu compres la trampa, que val 200 i escaig euros, i bueno, la tindràs per... Si la cuides bé, 7 anys o així, però cada any hauràs de comprar 2 o 3 per trampa, 2 atraients o 3 per trampes, que és el que assegura el cos i el benefici de l'empresa. Clar.

D'acord. I això fa... És una pregunta, eh. Això fa que, a nivell domèstic, no s'utilitzin tant trampes, no? Suposo.

Clar, és que no hi ha un... És a dir, els productes que hi ha actualment per interiors són endollables. Endollables. I ara sí que el de res pocida que ha hagut, Milba treurà un endollable molt bo, amb olis essencials, que no és biocida.

D'acord. Perquè els endollables, el problema que té és que la gent, una, els utilitza malament, en la qual cosa... A vegades deixen de tenir sentit i a vegades representen un risc per les persones, perquè un endollable de biocida necessita que estigui al lloc ventilat, perquè tu estàs cremant aquest biocida que es queda en el medi. Llavors, si això no està ventilat, la concentració de biocida en una habitació petita pot ser molt elevada.

Després són endollables que no es poden posar als capsals dels llits. En molts episodis d'intoxicació amb nens petits, amb aquest tipus d'endollables, perquè estan inhalant tota la nit al costat del capsal el producte. De manera que utilitza un biocida així, nosaltres aquí no el recomanem.

No el recomanem. Preferim col·locar-ho en mosquiteres, fer una bona protecció, abans d'un endollable que al final compraràs vàrios i per una mica més de diners posaràs una barrera física permanent. Llavors, això no ho recomanàvem, però ara sí que ha sortit un d'aolis essencials que té un potent efecte de repulsió.

Llavors, ho hem de provar. Ens han arribat unes mostres i ho provarem, però sí que el mercat sembla que està desenvolupant coses noves en aquest sentit. D'acord.

Suposo que també és perquè és una plaga creixent al final. Bueno, clar, els mosquits a l'estiu és problemàtic i depenent de la zona on estiguis, encara més. És a dir, el clima mediterrani, és rar que no tinguis quatre mesos en activitat de mosquits en qualsevol zona d'Espanya.

Andalusia té deu mesos amb mosquits. Clar. Aquí a Barcelona estem en els vuit mesos, aproximadament, en presència i incidència de mosquits. Tenim quatre descans. I això anirà canviant, anirà canviant. D'acord.

Bé, i tant. Volia saber si... Bé, més o menys ho heu comentat, eh? Però si em podies fer un breu... un comentari molt breu sobre les... de les tècniques i dels productes que s'utilitzen actualment. Les limitacions principals. Perquè jo vaig fer un... Bé, vaig fer una enquesta anònima i vaig veure que hi havia un pain point de la població extra, eficàcia i també preocupació pels químics, perquè fos un control eco-friendly i tot això. I a mi se m'ha plantejat com que potser el pain point estava allà. Però és veritat que a les entrevistes que he fet sobre el tema dels larvicides, que no tenen impacte en el medi, etcètera. Doncs quina et diries, si aquest no és el pain point, o potser sí, eh? Però quina et diries que són les limitacions dels processos que es fan actualment?

Ho vols a la propietat privada o a l'àrea pública? Perquè és molt diferent. Ja. El meu projecte és... És a dir, per exemple, t'ho dic perquè... és a dir, limitacions nosaltres les tenim principalment a nivell de via pública en els productes adulticides.

Perquè el registre d'adulticides cada vegada ens està limitant més. Està en un procés d'avaluació de productes i quasi que estem quedant sense productes aplicant a l'exterior. En base a Epidetroid.

Tots estan pensats per interiors. Per exteriors en tenim molt poquets. Això ens està limitant molt una, la possibilitat de rotació del producte, per exemple, per evitar resistències, i l'altra, la disponibilitat.

És una qüestió ja gairebé de disponibilitat. A nivell de l'herbicida, bé, no tenim... De fet, en els darrers 20 anys ha sortit algun altre l'herbicida combinat que la veritat és que dona més persistència, és molt eficaç, és un producte molt segur i molt avalat per la comunitat científica en la qual cosa recolza molt bé aquesta part de tractament del cicle aquàtic. A la via pública, en personal, capacitat i professional.

El problema d'això ens trobem quan la gent ens demana en propietat privada què fem quan tenim larves i no puc abocar aquell recipient. Perquè és molt passat, perquè l'estructura no permet, pel que sigui. Productes, l'herbicides biològics, en el mercat, d'ús domèstic, no hi ha.

No hi ha. Hi ha d'anar a registrar algú, però no està comercialitzat en la qual cosa, flaco favor, aquí sí que tenim un problema. Un problema que s'ha intentat solucionar no amb l'herbicida, però sí amb silicones.

La silicona sí que s'ha comercialitzat, no és un biocida, llavors s'ha comercialitzat de diferent manera, diferents cases, que a vegades estan traient més, i això és l'únic que poden fer en el cicle aquàtic, en propietat privada, perquè l'herbicides no en tenim. I l'alticides, doncs sí, hi ha molts d'ús domèstic, tipus espray o tal, també molt limitat, perquè al final, jo considero que si tu tens un problema de mosquits i has de fer un tractament, ha d'anar un professional per utilitzar un espray. Un espray, és a dir, està pensat per una cosa molt quirúrgica, normalment, ja només amb el tipus de dispensació, de listo para uso que tenen, és un tipus de veig alguna cosa i vaig a matar-ho, no? Si tu necessites fer un tractament, has de crear un servei que t'ho faci amb garanties.

Llavors, si jo hagués de dir alguna cosa de limitació, ho diria en els alticides per al tema registre, dels poc productes que s'estan quedant a l'exterior, i que això segurament serà un problema si no es dona una solució a mitjà termini. D'acord. Súper.

És bastant curiós perquè vaig fer una altra entrevista amb un proveïdor de trampes de plagues i tal, i vam concloure que els beneficis que obtenien de trampes de mosquits que venien a les empreses professionals per després fer l'aplicació d'ús domèstic, que en deuria ser la manera correcta de poder controlar la plaga, representaven molt poquet. És com que no... Ah, és que no es fiquen en aquest tipus de negoci. Igual, les viscides biològiques estan donant d'alta en el registre per ús domèstic, però no es comercialitzen perquè no hi ha mercat.

I ja per acabar, volia saber una mica també la demanda de temes ecològics en quant al control de mosquits.

Si veieu que per part de la població, de les institucions públiques, es demana amb rigorositat el control del mosquit que sigui més eco-friendly, més respectuós. Això és una tendència creixent. Sí.