

# Are growers and consumers the driven force for *Rubus* breeding?

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# Summary

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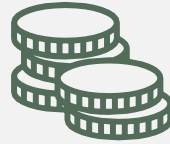
1. Introduction
  2. The breeding process
  3. Growers objectives
  4. Consumers requests
  5. Breeders problems
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# 1. Introduction

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Raspberry production



- > High economical value
- > Export oriented



- > Ideal environmental setting
- > 5<sup>th</sup> largest producer in Europe and 8<sup>th</sup> largest producer in the world



- > Production is technically demanding
- > Increasing demand for quality and sustainability

## Breeding and selection of new material must:

- Be adapted to the region of production,
- Possess relevant characteristics in the market of interest,
- Maximize production sustainability, producers competitiveness and crop profitability.

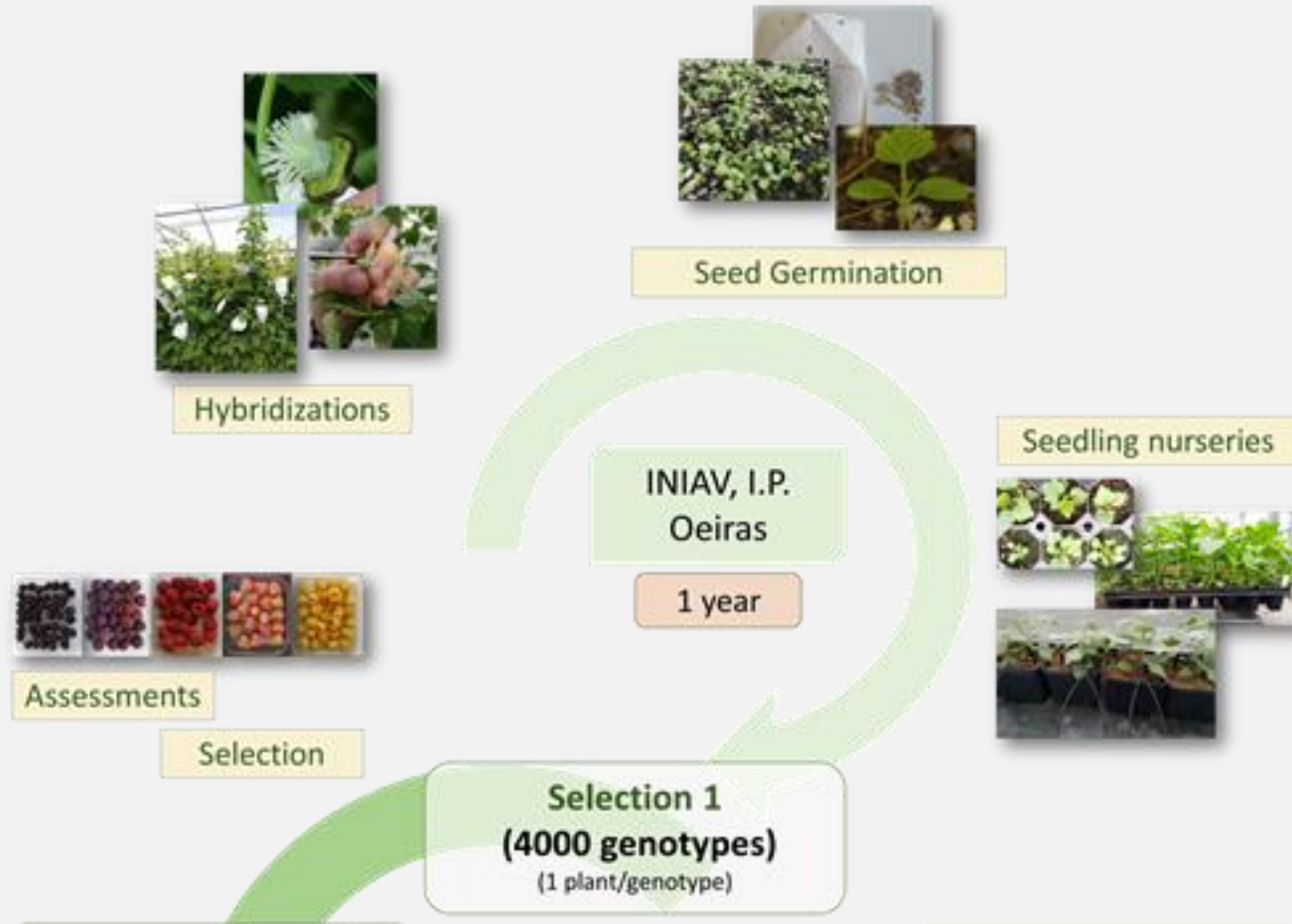


## Collaborative Breeding Program



## 2. The breeding process

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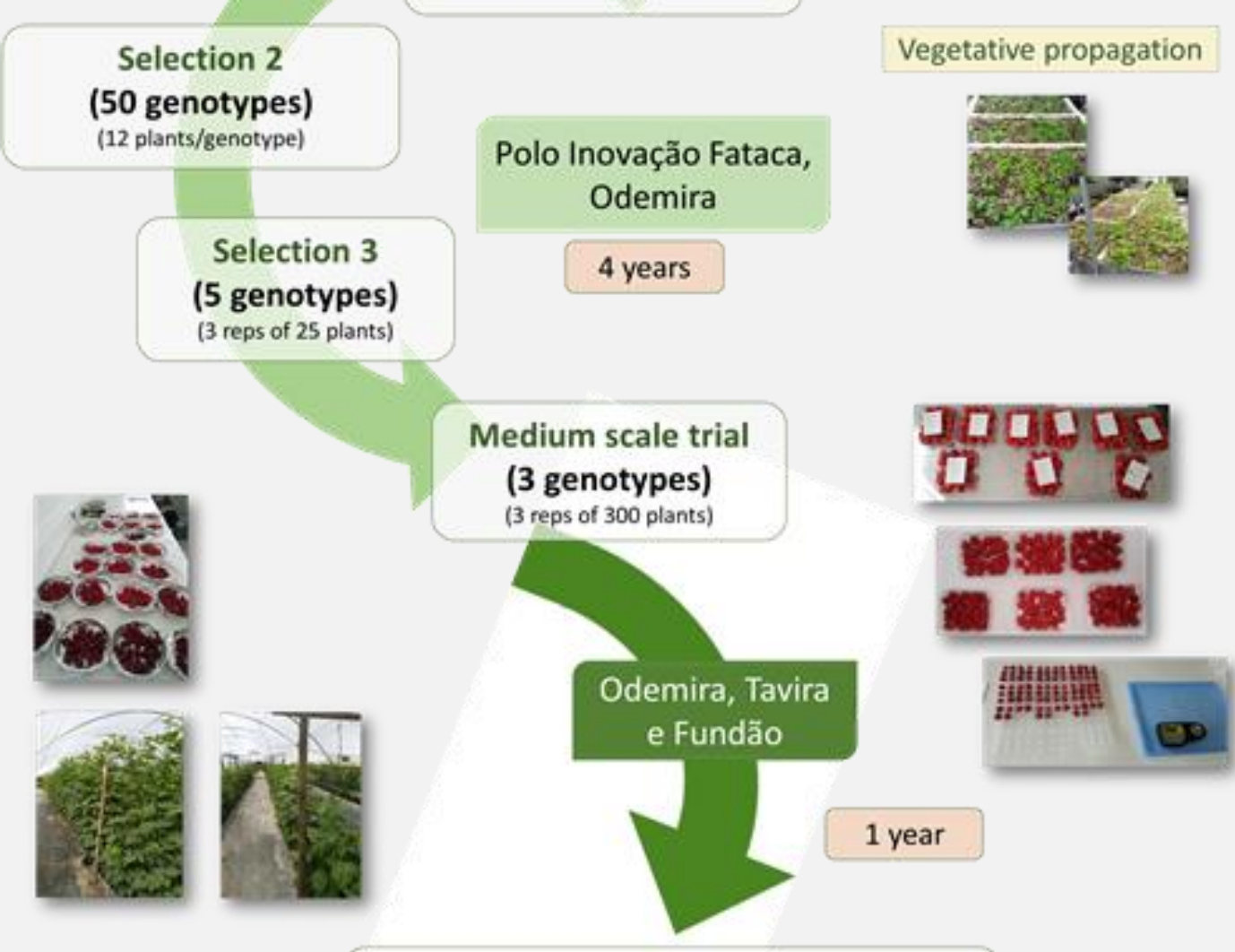


**4000**  
**Genotypes**

**1 Year**

# 2. The breeding process

Replicated trial



50  
Genotypes

+ 1 Years

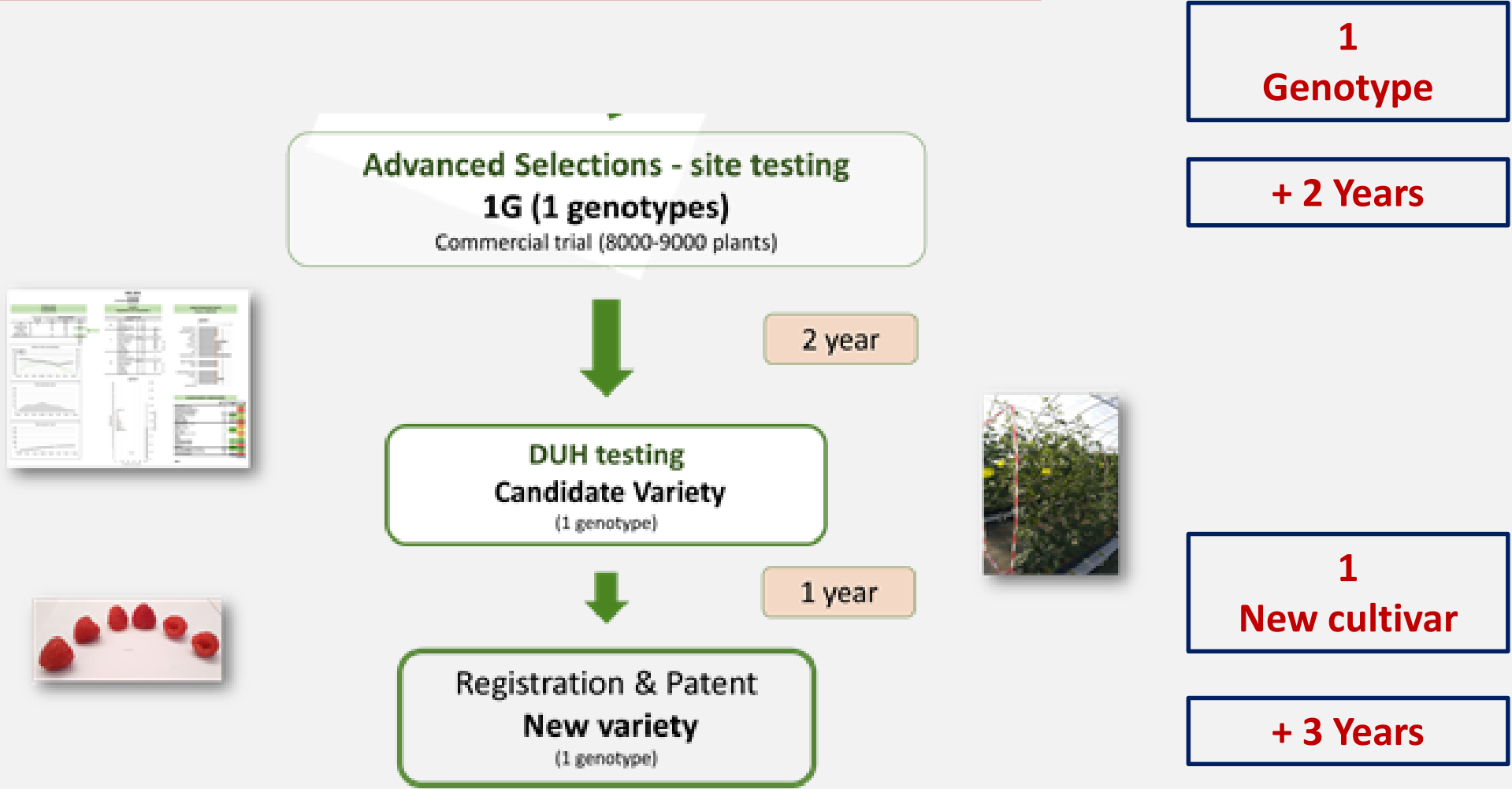
5  
Genotypes

+ 1 Years

3  
Genotypes

+ 1 Years

# 2. The breeding process





# Example

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## One promising advance selection

### **Female Parent** (FP)

- Good flavor
- Uniform fruit size
- Good shelf-life performance
- Good productivity
- Adequate plant architecture

## Three problems



High rust susceptibility

Late primocane production



Dark fruit color



# Crossings

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**Female Parent**  
(FP)



x

**Male Parent**  
1 (MP1)



**Rust resistance**  
*Family 1*

x

**Male Parent**  
2 (MP2)



**Earliness**  
*Family 2*

x

**Male Parent**  
3 (PM3)

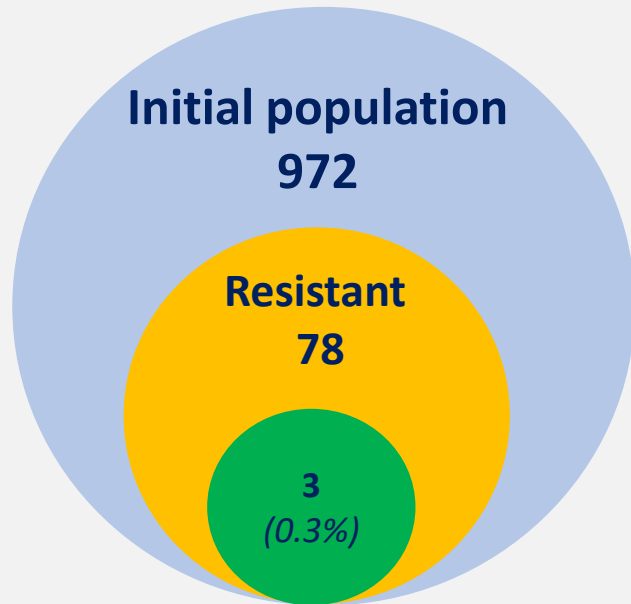


**Fruit color**  
*Family 3*

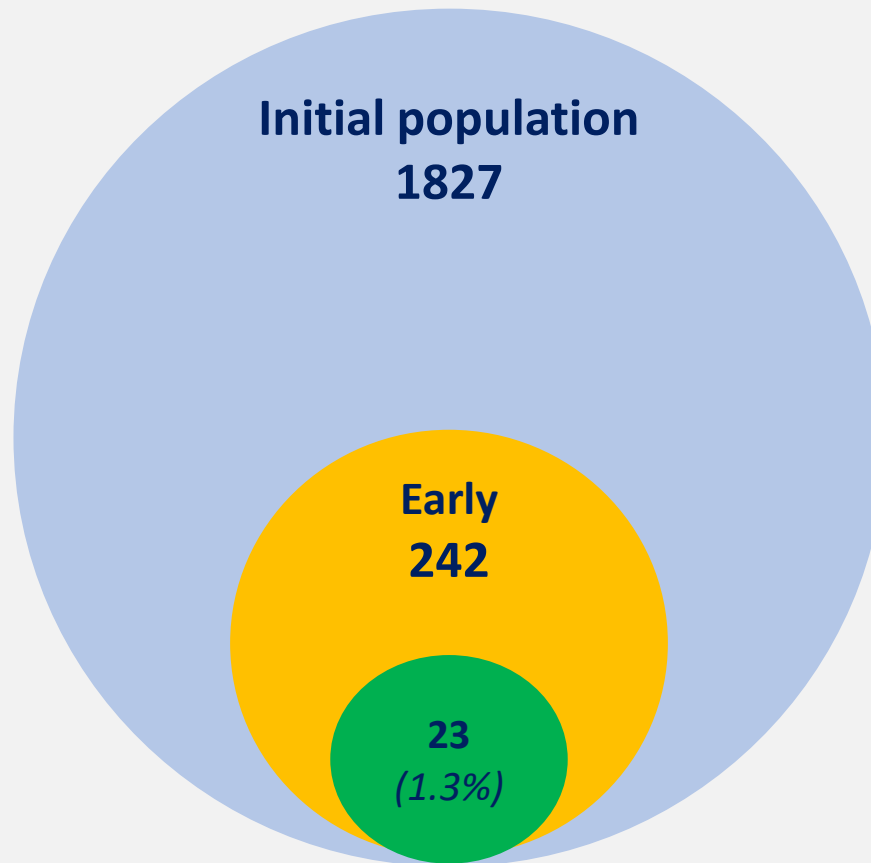
# Final selections

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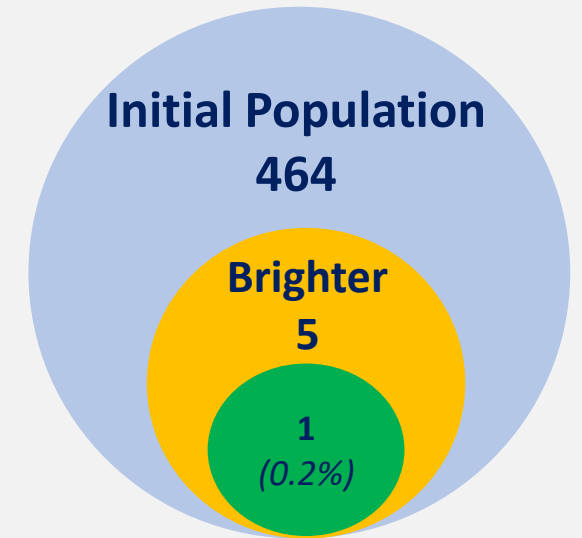
## F1: Late leaf rust



## F2: Earliness



## F3: Fruit color



# Future work

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F1: Late leaf rust

F2: Earliness

F3: Fruit color

Kept  
**3**  
(0.3%)

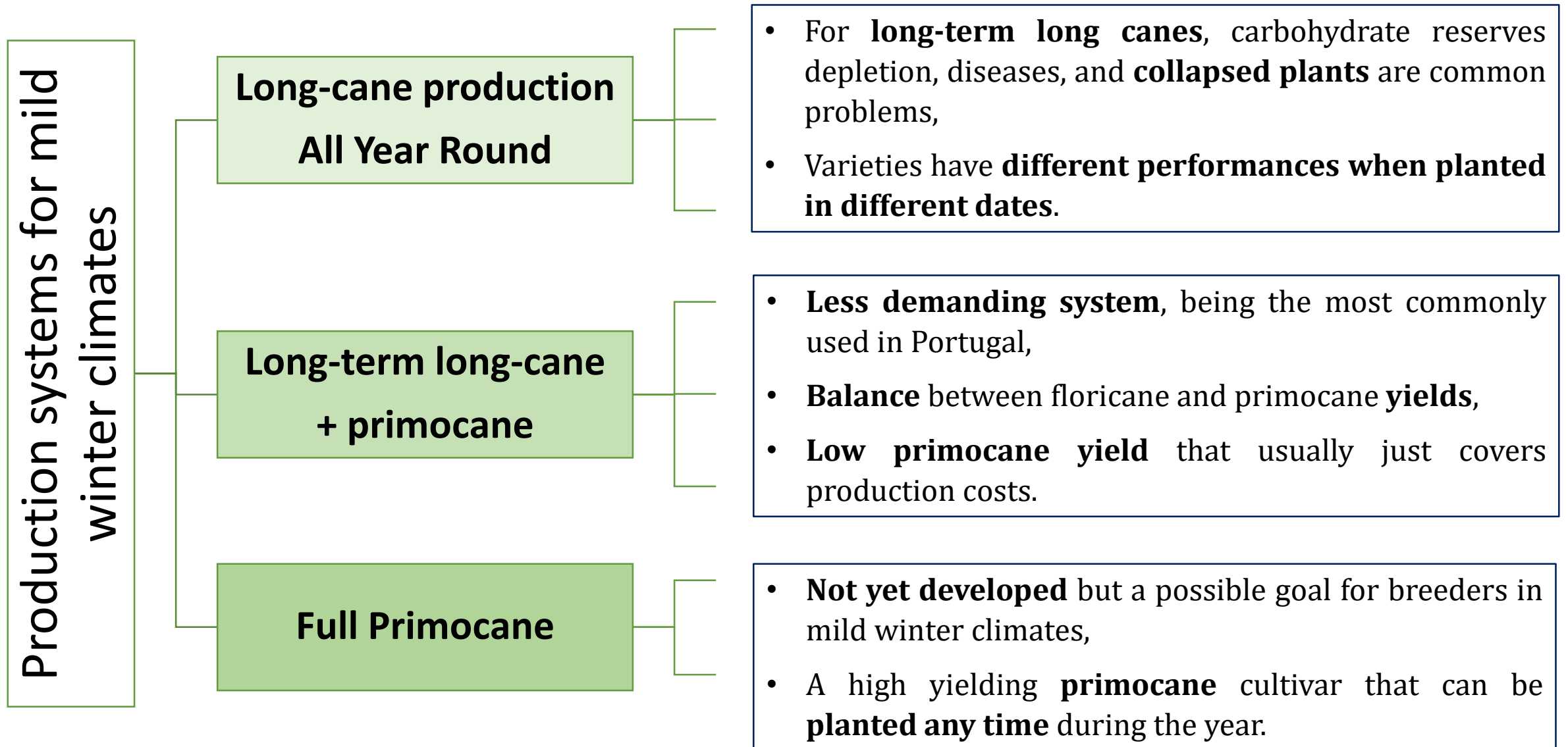
Kept  
**23**  
(1.3%)

Kept  
**1**  
(0.2%)

**Combine the 3 desired characteristics in  
one elite genotype**

### 3. Growers objectives

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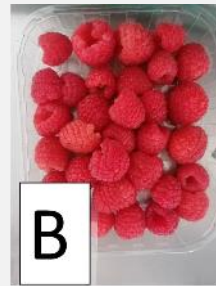


# Promising selections

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A



B



C



D



E



# 4. Consumers requests

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# 4. Consumers requests



|            |   | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8  | 9  | 10 |
|------------|---|---|---|---|---|---|---|----|----|----|----|
| Appearance | A | 0 | 0 | 1 | 0 | 0 | 4 | 9  | 14 | 6  | 2  |
|            | B | 0 | 0 | 0 | 0 | 1 | 3 | 6  | 11 | 14 | 3  |
|            | C | 0 | 0 | 1 | 0 | 1 | 4 | 9  | 6  | 11 | 6  |
|            | D | 0 | 0 | 1 | 4 | 6 | 5 | 4  | 3  | 9  | 4  |
|            | E | 0 | 0 | 0 | 2 | 5 | 4 | 7  | 6  | 8  | 6  |
| Tasting    | A | 0 | 1 | 1 | 4 | 3 | 8 | 5  | 10 | 4  | 1  |
|            | B | 0 | 0 | 0 | 2 | 2 | 4 | 5  | 11 | 11 | 3  |
|            | C | 0 | 0 | 2 | 0 | 2 | 6 | 7  | 8  | 8  | 4  |
|            | D | 0 | 1 | 1 | 3 | 3 | 7 | 7  | 7  | 6  | 3  |
|            | E | 0 | 0 | 0 | 0 | 0 | 3 | 5  | 8  | 12 | 9  |
| Global     | A | 0 | 0 | 0 | 4 | 4 | 6 | 8  | 11 | 3  | 1  |
|            | B | 0 | 0 | 0 | 1 | 4 | 3 | 10 | 7  | 10 | 3  |
|            | C | 0 | 0 | 1 | 1 | 2 | 7 | 6  | 10 | 8  | 2  |
|            | D | 0 | 0 | 2 | 3 | 5 | 5 | 8  | 5  | 6  | 2  |
|            | E | 0 | 0 | 0 | 0 | 0 | 3 | 9  | 9  | 10 | 6  |

# 5. Breeders problems

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**Crumbly fruit**



**root buds**



**Fruit color**



**Rust**



**Spider mites**

**Collapses**





# 5. Breeders problems

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**Aphides**



**“Double fruit”**



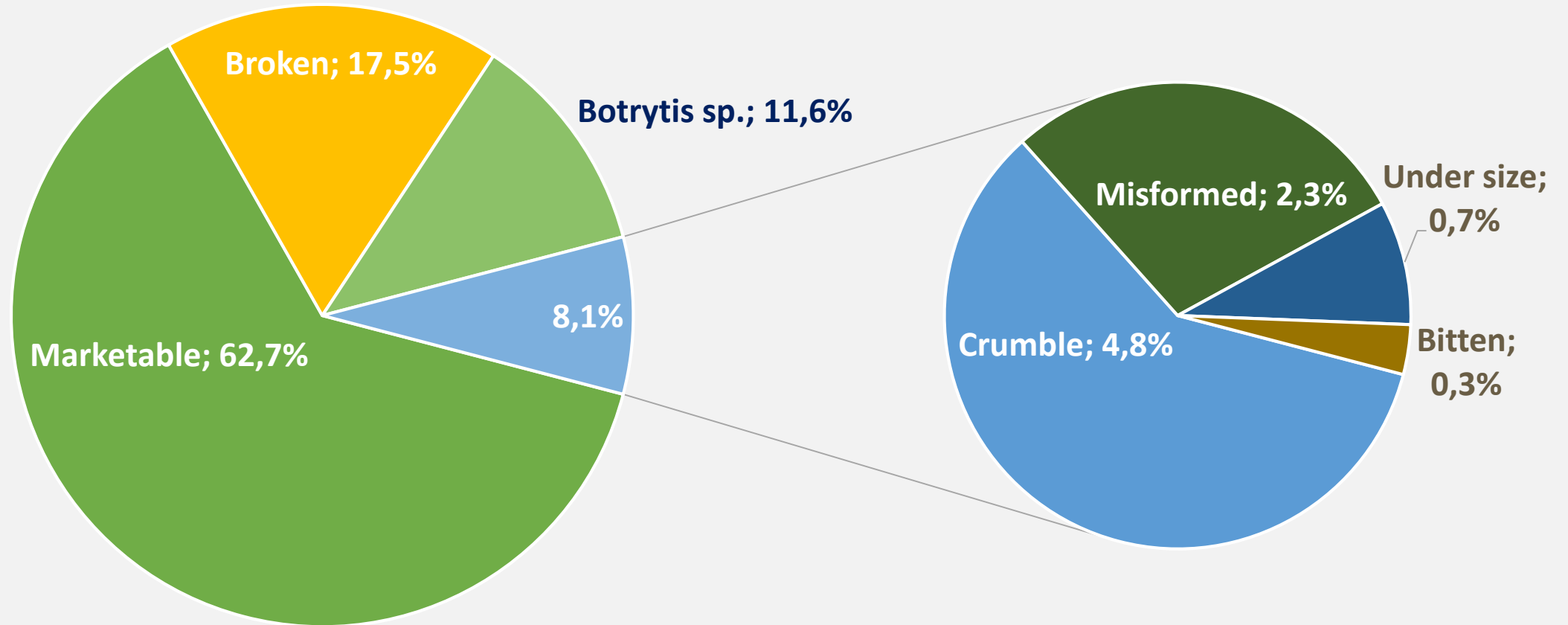
**Lateral  
development**



**Receptacle  
shape**

# Unmarketable fruit causes

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# Are growers and consumers the driven force for *Rubus* breeding?

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## Growers

- Are they ready to pay for breeding?
- Are they well organized to assume the same breeding goals?
- How far are they prepare for new production systems?
- Do they accept reductions on yield for a more sustainable production?

## Consumers

- How to define the average consumer? Do retailers represent consumers?
- Consumers preferences change with time. What is the life expectation for a cultivar? Bigger berries? pink color? peach flavor?
- Which quality parameter is the most important? Darker fruit?

# Are growers and consumers the driven force for *Rubus* breeding?

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## Breeders

- What should breeders do?
  - Breed for productivity?
  - Breed for a specific market?
  - Breed for a specific production system?
  - Breed for pest and diseases resistance?
  - Breed for less agrochemical inputs?
  - Breed for more resilient genotypes?
  - Breed for longer shelf life?
  - Breed for better taste berries?

**Participative breeding is the most suitable program for  
Growers, Retailers and Consumers!**



# The breeding team

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## INIAV, I.P.

- Selection – Francisco Luz – PhD student **Ok!**
- Crosses – Cândida Trindade – INIAV Technician; **Ok!**
- Breeding Plan – Teresa Valdiviesso – INIAV Researcher; **Ok!**
- Breeding and Protocol Manager – Pedro Brás de Oliveira – INIAV Researcher; **Ok!**

## Beirabaga

- Breeding team – Francisco Luz – Technician; **Ok!**
- Field advance selections performance – Sofia Guerreiro – Field technician; **Ok!**
- Quality and market performance – Sofia Horgan – Sales Director; **Ok!**
- Financial and strategical decisions – David Horgan – Manager; **Ok!**

