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‘Impact of EDV Concept on Plant Breeding: Outlook for vegetables’

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INTRODUCTION

Bejo, breeder of vegetable seeds for the professional grower

Together for the long term

Raising the bar with innovations

Harvesting now and fifty years from now

Quality: the best seeds and the best varieties
EXPLORING SINCE

1899
Jacob Jong starts in seed trade

1912
Baker’s son Cor Beemsterboer starts in seed trade

1978
Merger
Cor Beemsterboer & Jacob Jong become Bejo Zaden

1980s
Advances in research marker technology

1995
Merger
Cor Beemsterboer & Jacob Jong become Bejo Zaden

2015
Acquisition of Agrisemen a lettuce breeding company

TODAY

► 1800 employees worldwide

► Broad assortment
50 crops, 1200 varieties

► Organic program
50 crops, 190 varieties

► Breeding, production & sales
around the world
Bejo assortment

BRASSICAS
ROOTED CROPS
ALLIUM
FRUIT CROPS
LEAF CROPS
VARIETY DEVELOPMENT CYCLE

Market Identification

Development Process
Breeding Research

Testing field trials
With customers

Seed Production
& Processing

Market Introduction
THE WORLD OF BEJO

Breeding stations

THE WORLD OF BEJO

Sales activities
WARMENHUIZEN
THE NETHERLANDS

- Quality control, processing and storage of globally produced Bejo seed
- Research Center

VARIETY PROTECTION

- Value of Breeders Exemption in Breeding
- Variety protection in hybrid vegetable crops
- Variety protection in OP varieties
- New Breeding Techniques and EDV
Value of Breeders Exemption in Breeding

Variety protection in hybrid vegetable crops

Variety protection in OP varieties

New Breeding Techniques and EDV
The breeders exemption provides plant breeders the opportunity to work with the top genetics available in the market, and improve their own varieties with it. This ensures a constant improvement of variety resistance and quality for the growers. The genetic background of a hybrid variety is protected as such, so Breeding companies receive fair revenue for their breeding effort.
Value of the Breeders Exemption in Breeding

- Vegetable Breeding companies are spending a substantial part of their turnover on R&D
- For Bejo, this amounts to over 15% of turnover, or €45 million
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- Trait patents can give additional protection

International Licensing Platform provides for fair access to patented traits
Value of Breeders Exemption in Breeding

Variety protection in hybrid vegetable crops

Variety protection in OP varieties

New Breeding Techniques and EDV

Variety protection in hybrid vegetable crops

- Hybrid varieties are formed by crossing a female and a male inbred line
Variety protection in hybrid vegetable crops
- Hybrid varieties are formed by crossing a female and a male inbred line
- Hybrid seed shows uniformity in quality, disease resistance and harvest time

A hybrid variety can only be (re)produced when you have access to the parental lines.
Variety protection in hybrid vegetable crops
- Hybrid varieties show full segregation when selfed (form of protection)
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- In fertile hybrids, female parental line can be present in hybrid seed lots (gentleman's agreement not to use)
- Male sterility is often used in hybrid varieties, no pollen is formed (extra layer of protection)
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- By Breeders rights on parental lines, hybrids are protected (PVP)

In normal breeding practice, the chances that use of a protected variety in a competitor's breeding process leads to an EDV are slim (except for deliberate copycat breeding)
Variety Protection

- Value of Breeders Exemption in Breeding
- Variety protection in hybrid vegetable crops
- Variety protection in OP varieties
- New Breeding Techniques and EDV

Variety Protection

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- Resulting seeds can be used to multiply the material
- Breeding with this material is more likely to result in an EDV when compared to breeding with hybrids
- Lettuce is one of the few crops in Bejo that is OP

Agreement on use of material in lettuce breeding programs (Use of competitor variety in a backcross program more than once may lead to an EDV)
VARIETY PROTECTION

► Value of Breeders Exemption in Breeding
► Variety protection in hybrid vegetable crops
► Variety protection in OP varieties
► New Breeding Techniques and EDV

VARIETY PROTECTION

► New Breeding Techniques and EDV
  • All Lettuce varieties are OP varieties
New Breeding Techniques and EDV
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- Bremia resistance is an important trait in variety development (make or break trait in the market)

Resistance is often broken within two to five years, rat race between Breeder and pathogen
New Breeding Techniques and EDV

• What if a third party with access to Gene Editing Technology comes up with a way to modify a gene involved in Bremia susceptibility to ensure durable resistance?

• And they decide to edit this trait in the leading varieties in the market?
New Breeding Techniques and EDV
- What if a third party with access to Gene Editing Technology comes up with a way to modify a gene involved in Bremia susceptibility to ensure durable resistance?
- And they decide to edit this trait in the leading varieties in the market?
- According to the some interpretations of the EDV concept, this trait is sufficiently innovative to claim the developed varieties do not qualify as EDVs

New Breeding Techniques and EDV
- The initial developers would lose the competitive advantage in the market and thus lose market share by being replaced by their own improved varieties
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- Because of the non-EDV principle, the developers of the initial variety will receive no remuneration for their breeding effort.

- The OP nature of this crop means that propagation and seed production of the improved varieties is easily achieved.
► New Breeding Techniques and EDV
  • The initial developers would lose the competitive advantage in the market and thus lose market share by being replaced by their own improved varieties
  • Because of the non-EDV principle, the developers of the initial variety will receive no remuneration for their breeding effort
  • The OP nature of this crop means that propagation and seed production of the improved varieties is easily achieved
  • The third party can benefit from years of market development, breeding effort and contributions to research projects in the public domain by the lettuce breeding companies at limited costs

► Incorrect interpretation of the explanatory notes can lead to an imbalance in variety rights
CONCLUSIONS

► Incorrect interpretation of the explanatory notes can lead to an imbalance in variety rights

► An opening of the EDV explanatory notes can remedy this imbalance

► Proper protection of the efforts and investments made by the Breeding companies leads to continued improvement of varieties, which is translated into farmers benefits
Exploring nature never stops