

# Progress in Maintenance Breeding of Polish Hemp Cultivar Białobrzeskie

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## Milestones in hemp breeding

- 1956 - monoicous hemp cycle breeding begun.
- 1968 - first Polish monoecious hemp cultivar registred – Białobrzeskie.
- Due to Białobrzeskie high economic value it replaced gradually all imported cultivars after 1970.

**Currently three Polish hemp cultivars are enrolled in the National Register of COBORU and two of them\* in EU Catalogue of Agricultural Crops:**

- Białobrzeskie\* (1968)
- Beniko\* (1985)
- Silesia (2000)



**Białobrzeskie, Beniko and Silesia are:**

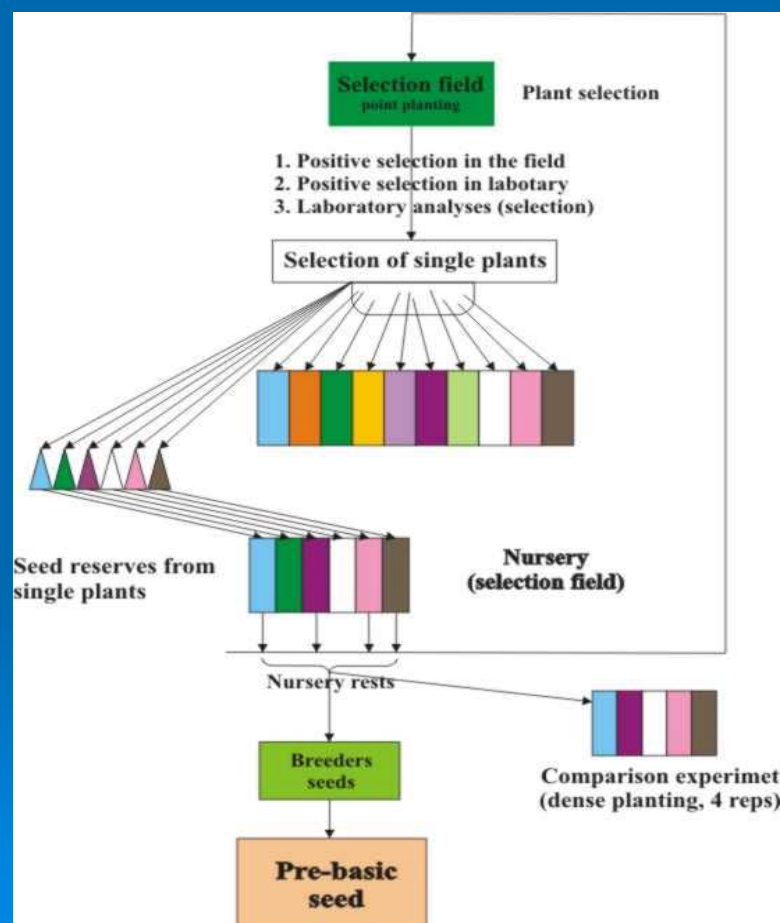
- monoecious,
- adapted to the soil and climatic conditions of Poland,
- high economical value,
- contain below 0,2%  $\Delta$  9THC.



# Objectives of the maintenance breeding:

- improvement of monoeciousness
- increase of economic performance

## Scheme of maintenance breeding



## Selection plot

During flowering plants are selected for the monoeciousness.

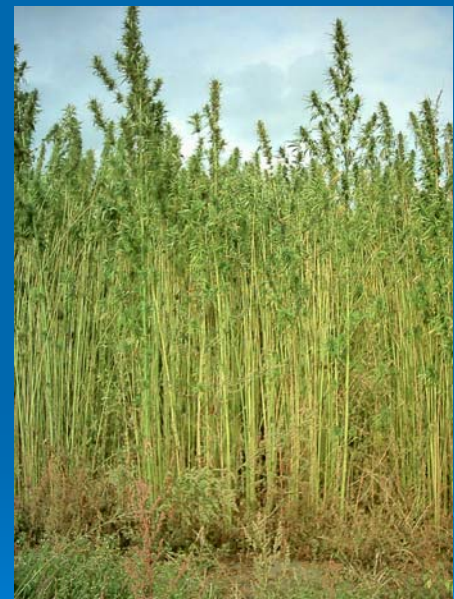
Selected individual plants are subjected to laboratory analysis: morphological evaluation, straw and seed yield, content of fiber.



## Micro experiment

Three hundred seeds are planted in the two, 1.5 m<sup>2</sup> plots in row spacing 20 cm. Remaining seeds are kept as a reserve till the next year.

The results obtained in micro experiment are the baseline for selection of the best individual plants for further breeding.

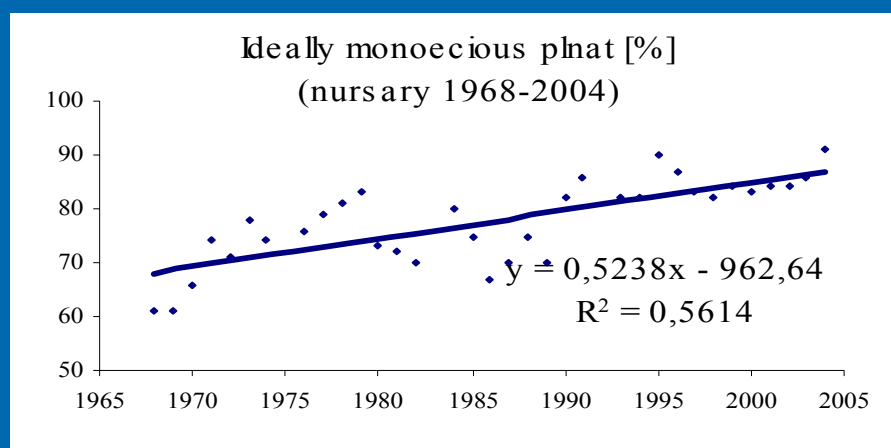


## Results of maintenance breeding

The results of maintenance breeding carried out according to the methodology developed at the INF can be analyzed by the results obtained from nurseries (selection plots) and micro experiments with cultivar Białobrzeskie registered over 35 years ago.

The main objective in the maintenance breeding is to consolidate monoeciousness and increase the fibre yield.

## Monoeciousness



Białobrzeskie from the very beginning has been maintained as a monoecious hemp with a famine phenotype.

# Keeping monoeciousness is also a responsibility of seed production:

- spatial isolation of seed plantations,
- carrying out a negative selection of male plants before pollination,
- controlling obtained sowing seeds for monoeciousness.

## Technical length of straw and straw yields

Fig. 3. Technical length [cm]  
(micro experimnts 1970-2003)

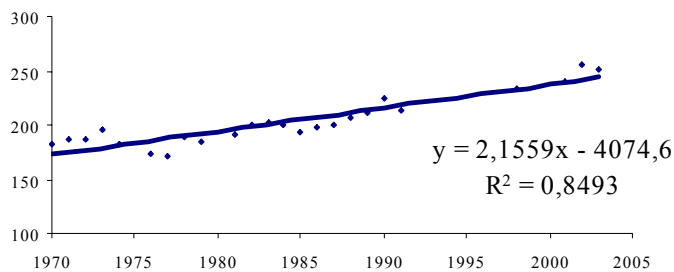
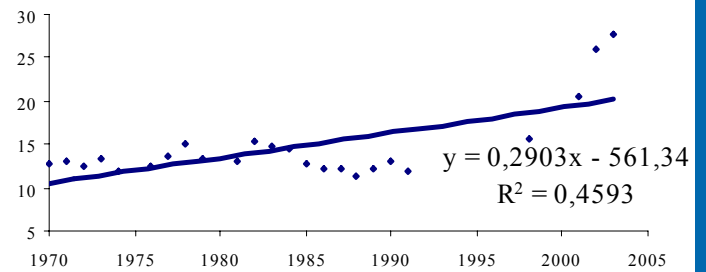


Fig. 4. Straw yield [t/ha]  
(micro experimnts 1970-2003)]

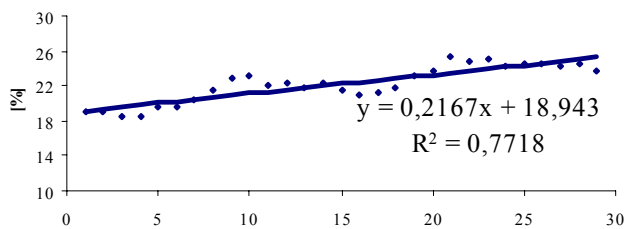


The calculated regression formulae show that both yield parameters increased linearly as a result of maintenance breeding.

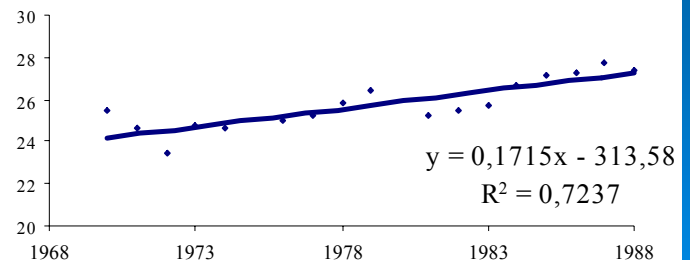
# Content of fiber

According to the theoretical values calculated by the regression formulae, a linear increase of fiber content can be observed (regression coefficient 77 and 72%, respectively)

Fig. 5. Total fiber content in individual plants (nursary 1968-2003.)



Ryc. 6. Total fiber content [%] (micro experimnts 1968-1988)



# Economical value

The efficiency of maintenance breeding of Białobrzeskie is connected with improvement of economical value.

The increase of Białobrzeskie economical value in 1968-2004

Years of evaluation	Technical length of stem [cm]	Total fiber content [%]	Yield [t/ha]	
			Straw	Total fibre
1968-1972	191	24,8	13,5	3,3
2000-2004	254	27,0	20,4	5,4
Increase [%]	133	109	151	164

## Conclusions

1. The method of maintenance breeding developed at the INF allows not only for keeping the cultivar but also for improvement of its important parameters.
2. Keeping monoeciousness is a result of both breeder efforts and rigorously run seed production process

## Conclusions contd.

3. High yield of fiber, characteristic for the Białobrzeskie cultivar, and stabilized monoeciousness is a result of:
  - a) application of specific criteria of individual plants selection,
  - b) using the reserve method



**Thank you  
for your attention!!!**

