The productive value of new apple (*Malus domestica* Borkh.) genotypes bred at the National Institute of Horticultural Research, Skierniewice, Poland

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1. Objectives

One of the aims of the apple breeding program conducted at the National Institute of Horticultural Research in Skierniewice, Poland, is to develop new genotypes either resistant or showing low susceptibility to apple scab (*Venturia inaequalis*), apple powdery mildew (*Podosphaera leucotricha*) and fire blight (*Erwinia amylovora*). New cultivars should produce high yields of a good fruit quality and should be well adapted to climatic conditions of Poland. Cultivation of such cultivars is enabling the production of apples without or with very low level of chemical residues harmful to human health at markedly reduced production costs.

2. Material and methods

- Productive value of five new apple breeding clones: No. 22 (J-2003-11-02 – ‘Gold Milenium’ x ‘Szampion’), No. 26 (J-2003-11-05 – ‘Gold Milenium’ x ‘Szampion’), No. 28 (J-2003-11-04 – ‘Gold Milenium’ x ‘Szampion’), No. 69 (J-2003-05 – ‘Melfree’ x ‘Sawa’), No. 70 (J-2003-11 – ‘Gold Milenium’ x ‘Szampion’) was evaluated at the National Institute of Horticultural Research (InHort), Skierniewice, Central Poland.
- The clones were compared to the standard cultivars ‘Szampion’ and ‘Gold Milenium’.
- The plant material was produced by the hand-winter grafting of genotypes on M.9 rootstock.
- Trees, about 1.5 m height single shoots, were planted in 2015 in a medium fertile soil in the orchard.
- Trees in the experimental trial were planted at the density of 3.5 m x 1.25 m in the randomized block design (3 replications, 3 trees per plot).
- Studies and observations were conducted during eight consecutive seasons (2017-2024).
- The trees vigour, flower intensity, ripening time, fruit yield and fruit quality (including: weight, skin color, shape, attractiveness and taste) were assessed.

Szampion

Gold Milenium

3. Results and discussions

Table 1

List of apple clones and traits of trees and fruits evaluated in the comparative experiment (Skierniewice, Sad Pomologiczny 2024)

Lp.	Clone (Cultivar)	Pedigree	Flowering intensity	Yield (kg/tree)	Fruit weight (g)	Trunk diameter (mm)
1	Szampion	standard	3,9*	11,1	206	54,8
2	Gold Milenium	standard	3,3	6,5	190	58,3
3	No. 70 (J-2003-11)	'Gold Milenium' x 'Szampion'	3,5	7,2	191	51,3
4	No. 22 (J-2003-11-02)	'Gold Milenium' x 'Szampion'	3,9	9,7	216	54,9
5	No. 26 (J-2003-11-05)	'Gold Milenium' x 'Szampion'	4,1	8,1	199	55,9
6	No. 28 (J-2003-11-04)	'Gold Milenium' x 'Szampion'	4,7	16,6	185	55,3
7	No. 69 (J-2003-05)	'Melfree' x 'Sawa'	4,2	10,4	231	60,2

Explanation: * – Point scale 1 – 5: 1 – lack of flowers, 5 – very abundant flowering

- The most promising genotype, was the late ripening clone No. 28 (J-2003-11-04), obtained from the cross combination of 'Gold Milenium' and 'Szampion'.
- Its fruit yield was approximately 30% higher in comparison to 'Szampion' standard cultivar and surpassed it in fruit taste and attractiveness.

4. Conclusions and perspectives

- Fruits are medium to large, oblong conical, ground colour is green-yellow.
- Harvest time is in the second half of September.
- Yields annually, does not require thinning of the buds.
- Cold storage – until the end of March.
- This cultivar is resistant to apple scab in field conditions, showing also a high level of resistance to powdery mildew and fire blight.
- This genotype will be submitted to the Polish National List of Fruit Plant Varieties.

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