

CULTIVAR RELEASE

IPR 107 – Dwarf arabic coffee cultivar with resistance to coffee leaf rust

Tumoru Sera¹ and Gustavo Hiroshi Sera^{1*}

Received 05 September 2012

Accepted 06 September 2013

Abstract – ‘IPR 107’ was derived from a cross between ‘IAPAR 59’ and ‘Mundo Novo IAC 376-4’. ‘IPR 107’ is a dwarf medium size plant with medium precocity in ripening and with complete resistance to rust races in this time. This cultivar presents superior quality and high yield in many coffee regions.

Key words: Coffee leaf rust, *Coffea arabica*, breeding, Sarchimor.

INTRODUCTION

The cultivars of germplasm Mundo Novo are widely cultivated in Brazil. It is a rustic and high yielding cultivar with wide adaptability. “Mundo Novo” presents normal stature with large internode, which is not favorable to high productivity per area in adensed coffee system, and it is susceptible to all important diseases. ‘IPR 107’ was developed to combine the dwarf size and resistance to rust of ‘IAPAR 59’ with the rusticity of ‘Mundo Novo IAC 376-4’.

‘IPR 107’, released in 2010, is a dwarf medium size cultivar with complete resistance to leaf rust (*Hemileia vastatrix* Berk. et Br.) in this time (Sera et al. 2010a) and medium precocity in ripening. This cultivar is recommended for semi-dense, dense and super dense planting systems in areas with annual average temperature between 18 °C and 22 °C in the State of Paraná.

PEDIGREE AND IMPROVEMENT METHOD

‘IPR 107’ was developed using the genealogical method. It was derived from a cross between ‘IAPAR 59’ x ‘Mundo Novo IAC 376-4’, performed at IAPAR. The F2 generation was established in a private farm in municipalities of Tamarana, PR, Brazil. Seeds of many individual F2 plants were harvested and F3 progenies were established in 1998 (Londrina, PR, Brazil). Test crosses for rust resistance were carried out with F3 plants in order to identify coffees with

more genes resistant to leaf rust. The best F3 progenies with complete resistance to rust were advanced to F4 generation. The best F4 plants of the best progeny that present good agronomic traits and complete resistance to more rust races were advanced to F5 generation in 2006. In this generation, in 2010, ‘IPR 107’ was released.

The mother plant of ‘IPR 107’ is ‘IAPAR 59’, which was derived from a cross between “Villa Sarchi CIFC 971/10” (*Coffea arabica* L.) and “Hibrido de Timor CIFC 832/2” (interspecific hybrid between *C. arabica* and *C. canephora*). ‘IAPAR 59’ is classified in physiologic group A, it is resistant to all rust races of the world, and it carries at least *SH5*, *SH6*, *SH7*, *SH8* and *SH9* resistance genes.

PERFORMANCE

‘IPR 107’ can be cultivated in regions with annual average temperature between 18 °C and 21 °C, such as Londrina (580m altitude) and Congonhinhas (750m altitude) municipalities. ‘IPR 107’ also can be cultivated in regions with annual average temperature of 22 °C. ‘IPR 107’ was evaluated in Paraná State with four annual harvests, and it was more productive than ‘IAPAR 59’ and ‘Catuaí Vermelho IAC 81’ (Table 1).

‘IPR 107’ is a dwarf plant (medium size ~ “Catuaí”), being recommended for spacing between plants varying from 0.50m to 0.70m, depending on the annual average temperature of local cultivation and on the used technologies such as fertilization, irrigation and pruning. In hot regions without

¹ Instituto Agronômico do Paraná (IAPAR), Rodovia Celso Garcia Cid, km 375, 86.047-902, Londrina, PR, Brazil. *E-mail: gustavosera@iapar.br

Table 1. Annual average yield per hectare (bags of 60 kg ha⁻¹) of ‘IPR 107’ in comparison with other cultivars

Cultivar ¹	Yield ²	% ³
IPR 107 (medium ripening)	72.54	110.60
Catuai Vermelho IAC 81 (late ripening)	65.59	100.00
IAPAR 59 (semi early ripening)	59.28	90.38

¹ With chemical control for coffee leaf rust.

² Mean of four annual harvests (spacing 2.75 x 0.50m).

³ Relative yield.

irrigation, the spacing ought to be narrower since the canopy diameter and branching are usually smaller. On farms with fertirrigation, the spacing between rows and between plants can be larger. On farms where pruning is frequently used, the spacing can be smaller. Using wider spacing between plants will increase plant yield; hence it will require more nutrition. In the State of Paraná, crops with spacing of 0.50m between plants have shown better productivity. The spacing between rows can vary from 2.50 m to 3.00 m according to the coffee crop area and the level of mechanization.

OTHER TRAITS

‘IPR 107’ presents medium precocity in ripening, similar to ‘Mundo Novo IAC 376-4’. At lower temperatures, with annual average between 18 °C and 21 °C, the ripening occurs usually in June. At higher temperatures, with annual average between 22 °C and 23 °C, the ripening occurs usually in April. This ripening cycle reduces frost losses to only one year per biennium, instead of two, since most fruits are already ripe when the frost occurs; thus, only the yield of the second year is affected.

‘IPR 107’ can be used in association with other dwarf coffee cultivars with different ripening times (e.g. ‘IPR 99’ = semi late, ‘IPR 100’ = late) in order to reduce the labor, infrastructure and equipment requirements. By using ‘IPR 107’ with other maturation group cultivars for harvest in different times, the rain risk at harvest is reduced and it is easier and cheaper to produce a quality coffee in the rainy and cool coffee regions of Paraná State.

The secondary plagiotropic branching of ‘IPR 107’ is lower than “Catuai” and higher than “Mundo Novo”.

IPR 107 – Cultivar de café arábica de porte compacto com resistência à ferrugem

Resumo – ‘IPR 107’ foi derivada do cruzamento entre ‘IAPAR 59’ e ‘Mundo Novo IAC 376-4’. ‘IPR 107’ é uma planta compacta de tamanho médio com maturação dos frutos mediano e com resistência à ferrugem. Essa cultivar apresenta qualidade de bebida superior e alta produtividade em várias regiões cafejeiras.

Palavras-chave: Coffea arabica, ferrugem do cafeeiro, melhoramento genético, Sarchimor.

Table 2. Morphological, physiological and agronomic traits of ‘IPR 107’ with the respective descriptions

Traits	Descriptions
Size (tree height)	Medium (~“Catuai”)
Canopy radius	Large (~“Acaiaí”)
Canopy architecture	Cylindric (~“Catuai”)
Internode length	Medium (~“Catuai”)
Secondary plagiotropic branching	Between medium (~“Mundo Novo”) and high (~“Catuai”)
Young leaf colour	Green and bronze
Leaf size	Between medium and large (larger than “Mundo Novo”)
Undulation of the leaf margin	Medium wavy (~“Mundo Novo”)
Colour of ripe fruits	Red
Fruit shape	Oblong (~“Mundo Novo”)
Fruit size	Between medium (~“Mundo Novo”) and large (~“Acaiaí”)
Grain length	Medium (~“Mundo Novo”)
Grain width	Large (~“Catuai”)
Ripening cycle	Medium (~“Mundo Novo”)
Resistance to rust	Complete resistance
Resistance to nematodes	Still not identified
Reaction to Brown Eye Spot (<i>Cercospora coffeicola</i>)	Susceptible
Cup quality	Similar or superior “Mundo Novo”

‘IPR 107’ has large and red fruits when ripe. The cup quality is equal or superior to “Mundo Novo”.

‘IPR 107’ presents complete resistance to rust (Sera et al. 2010a, Sera et al. 2010b). These and others traits are described in Table 2.

SEED MAINTENANCE AND DISTRIBUTION

‘IPR 107’ is registered by the National Cultivar Registry (Registro Nacional de Cultivares - RNC) of the Ministry of Agriculture, Livestock and Supply (Ministério da Agricultura Pecuária e Abastecimento – MAPA) under the number 09941, in Brazil. IAPAR is in charge of genetic and basic seeds, and private seed producers who are registered in MAPA are responsible for certified seeds.

REFERENCES

- Sera GH, Sera T, Fonseca ICB and Ito DS (2010a) Resistência à ferrugem alaranjada em cultivares de café. **Coffee Science** 5: 59-66.
- Sera GH, Sera T, Ito DS, Fonseca ICB, Kanayama FS, Del Grossi L and Shigueoka LH (2010b) Seleção para a resistência à ferrugem em progênies das cultivares de café IPR 99 e IPR 107. **Bragantia** 69: 547-554.