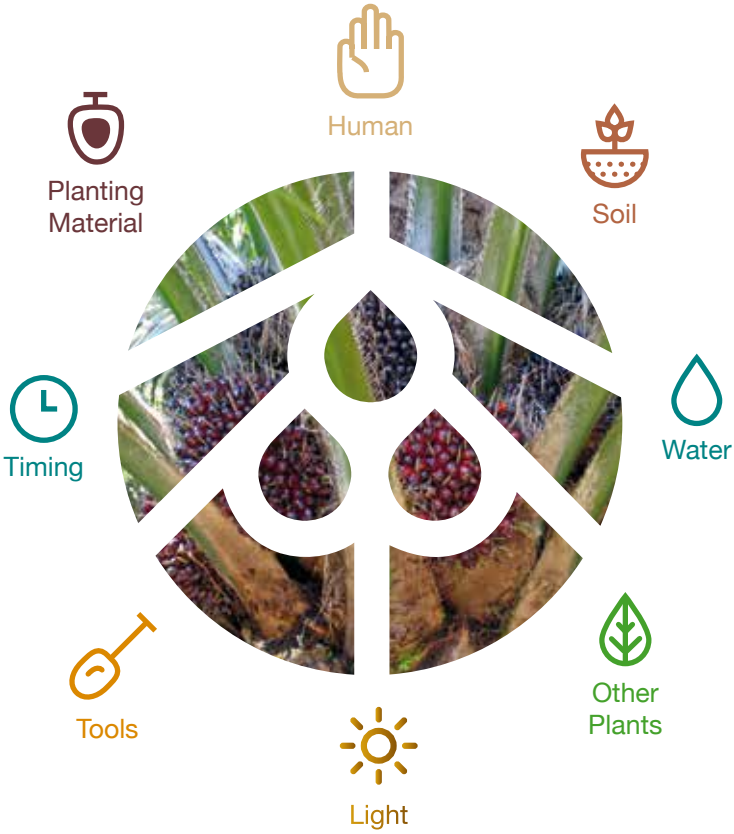


Technical characteristics of PalmElit-CIRAD®

#g #F #S DExLM

variety in different growing conditions

PALMELIT
OIL PALM SEEDS - CIRAD INSIDE

PalmElit has been distributing PalmElit-CIRAD® #g #F #S DExLM germinated seeds for many years in Africa.

The variety distributed is hardy and there is ample evidence that it is well suited to different African environments.

In addition, PalmElit always selects the most efficient planting material to best value the fertilization provided. The optimal yield will be obtained with reasoned fertilization (Cf: PalmElit Oil Palm Grower's Handbook).

	***Tenera* Deli x La Mé PalmElit-CIRAD® #g #F #S DExLM**		
	Average data in sandy soils[*1] (Planting density: 143 palms/Ha)		
	No water deficit	Water deficit ~200 mm/ years	Water deficit ~400 mm/ years
Tenera Hybrid	Yes	Yes	Yes
Resistance to *Ganoderma*[*2] (#g)	Intermediate resistance[*3]	Intermediate resistance[*3]	Intermediate resistance[*3]
Resistance to *Fusarium* wilt (#F)	High resistance[*3]	High resistance[*3]	High resistance[*3]
Average yearly height increment in cm (#S)	46-50 cm	44-48 cm	42-46 cm
Drought Tolerance	Tolerant	Tolerant	Tolerant
Bunch production (FFB) in adult age (> 7 years'old) in t/ha/year real conditions	30-32 t	25-27 t	18-20 t
Bunch production (FFB) in adult age[*4] (> 7 years'old) in t/ha/year (genetic trials)	31,5-33,6 t	26,2-28,3 t	18,9-21 t
Average bunch weight in adult age	< 18 kg	< 18 kg	< 18 kg
Oil mill extraction rate (CPO OER)	> 26 %	> 25 %	> 24 %
Oil laboratory extraction rate (CPO O/B)[*4]	~30 %	~29 %	~28 %
Oil mill extraction rate (PKO)	2-3 %	2-3 %	2-3 %
Oil laboratory extraction rate (PKO)[*4]	2,5-3,5%	2,5-3,5%	2,5-3,5%
Effective oil production (CPO) en t/ha/year	7,8-8,5 t	6,2-6,8 t	4,3-4,7 t
Total oil production (CPO + PKO) in t/ha/year	> 8,4 t	> 6,7 t	> 4,6 t
Iodine value (Wijs)	> 54	> 54	> 54
First harvest	2 years	2,5 years	3 years

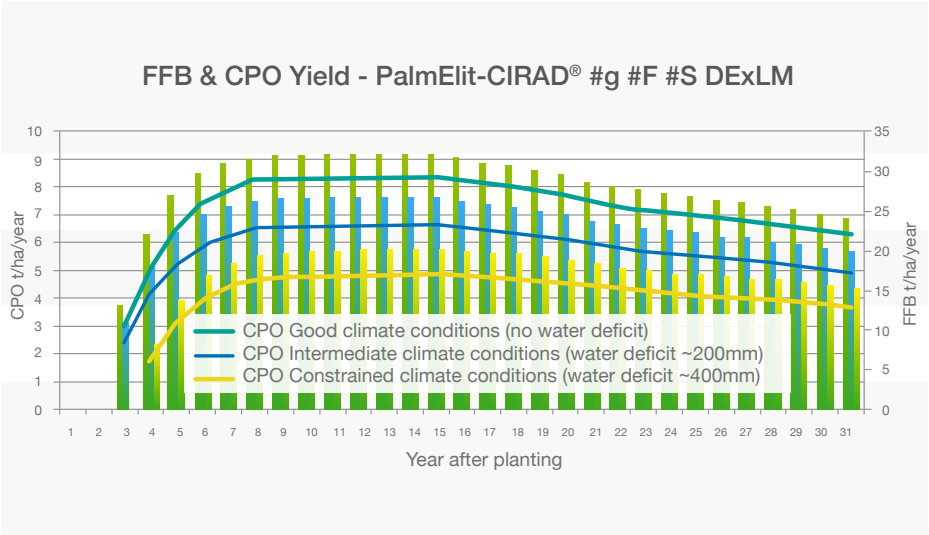
[*1] One must understand than the genetic performance of any oil palm planting material is impacted by crop management and environmental conditions: type of soils, climatic conditions. The most relevant is the water deficit (drought). We give our results for average sandy soils where our variety can yield 31 tons, but in excellent conditions, the yield can be 45 tons.

[*2] Resistance to Ganoderma has been evaluated in Indonesia on Asian strains, its validity for Africa and Latin America being very likely is being demonstrated in our laboratory in Cameroon and will soon be in Benin.

FFB & CPO yield estimations according the water deficit

PalmElit – CIRAD® seeds embody **80 years of genetic improvement work** undertaken by **IRHO**, **CIRAD** and **PalmElit** in conjunction with partners of excellence located on each of the continents where oil palm is grown.

The progress made in oil yields, measured scientifically, amounted to **+60%** between 1960 and 2010. It is still continuing today at a sustained rate.



We have observed the true potential of **CIRAD®** varieties in our trials in Indonesia, North Sumatera, under good climate (rainfall and sunlight) conditions, with sandy soils.

It is represented by the green curve (**CPO**) and bars (**FFB**) in the following graphic which are field data.

As an indication we have estimated production with **200 mm** (blue curve) and **400 mm** (yellow curve) of water deficit, based on results from a network of plantations using **CIRAD®** varieties.

[*3] PalmElit adopted the classification established by the international federation of seed companies (FIS) which graduates biotic resistance in different levels, according to the behavior of the variety in the face of attacks by a parasite or a specific pathogen: high resistance, intermediate resistance , sensitivity, immunity. The term tolerance is reserved for abiotic factors.
https://www.worldseed.org/our-work/plant-health/overview/

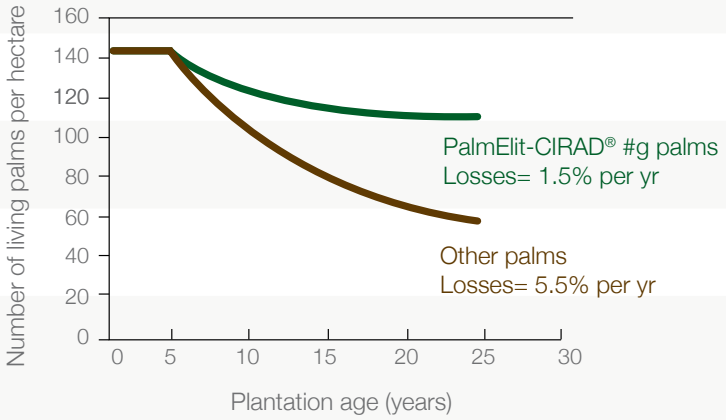
[*4] The oil extraction rate can be given in laboratory data (oil to bunch) or estimated in the mill (OER, oil extraction rate) there is a 15% difference between the two forms. FFB also can be estimated in genetic trials or estimated in the real estate conditions (5% difference). The total performance differences between results estimated in laboratory and genetic trials and estimated in the mill and in the plantation is around 20%.

Intermediate resistance to *Ganoderma*

#g is an option of oil palm protection from ***Ganoderma***.
Ganoderma is lethal and endemic in Asia, Africa and America, and can cause up to 80% mortality in plantations, with a higher risk in replantings.

The resistance passed on to seeds by our best parents is assessed in plantations and in large-scale screening tests on seedlings in the prenursery (on Asian *Ganoderma* strains).

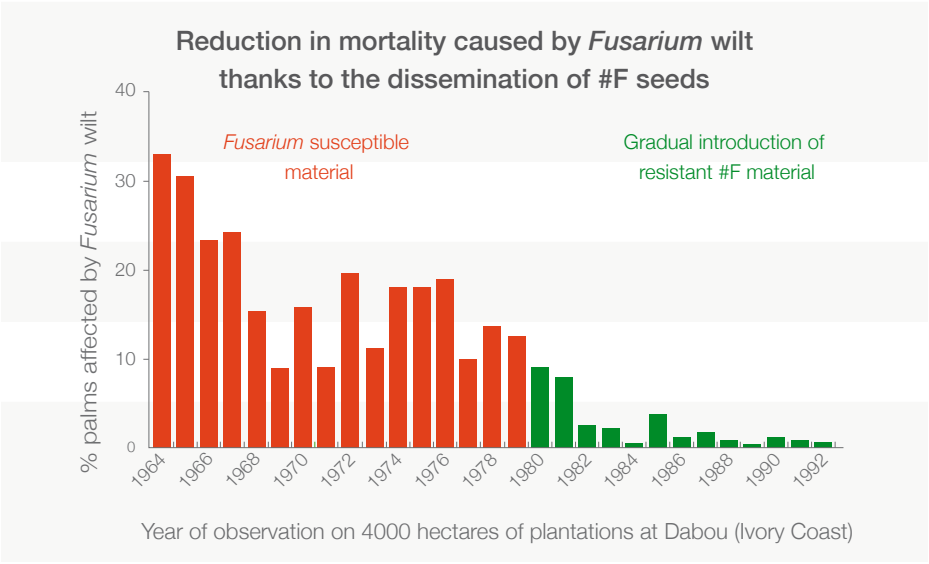
Simulation of losses caused by Ganoderma
Comparison between PalmElit-CIRAD® #g palms and Other palms



High resistance to *Fusarium* wilt

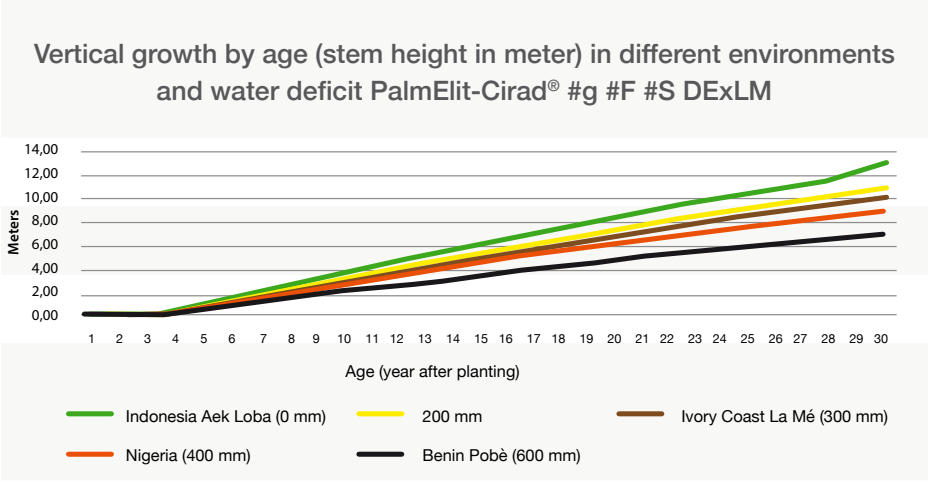
#F is an option of oil palm protection against ***Fusarium* wilt**.
Today, the resistance of our best parents is assessed in large-scale screening tests in the prenursery.
In the 1960s, yields at the Dabou estate (4,000 ha, Ivory Coast) were considerably reduced by *Fusarium* wilt which affected 35 to 40% of the oil palms.

Selection based on early screening helped to reduce losses to 10-15% as early as the 1970s, then gradually to less than 3%. Since the 1990s, the remission rate has been close to 100%.

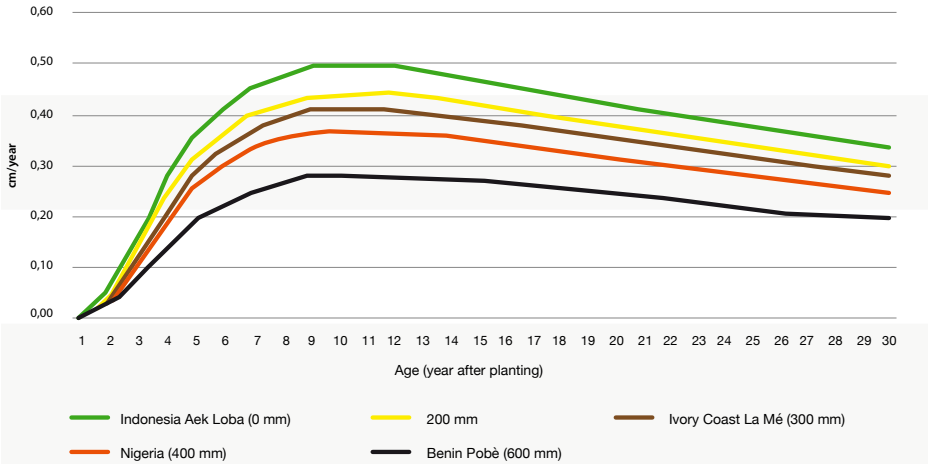


«Short», for better plantation sustainability

#S is an option of reduced vertical stipe growth, which helps to extend the working life of the plantation and makes FFB harvesting easier.
A slower vertical growth rate has been an intangible breeding target for PalmElit and its predecessors **IRHO** and **CIRAD** for 60 years. Our **#S** material embodies the success of this lengthy work.
The growth curves according the water deficit, given below, are indicative and the data may vary depending on climatic factors, characteristics of the soil and crop management



Stem vertical growth in cm/year
in different environments and water deficit
PalmElit-Cirad® #g #F #S DExLM

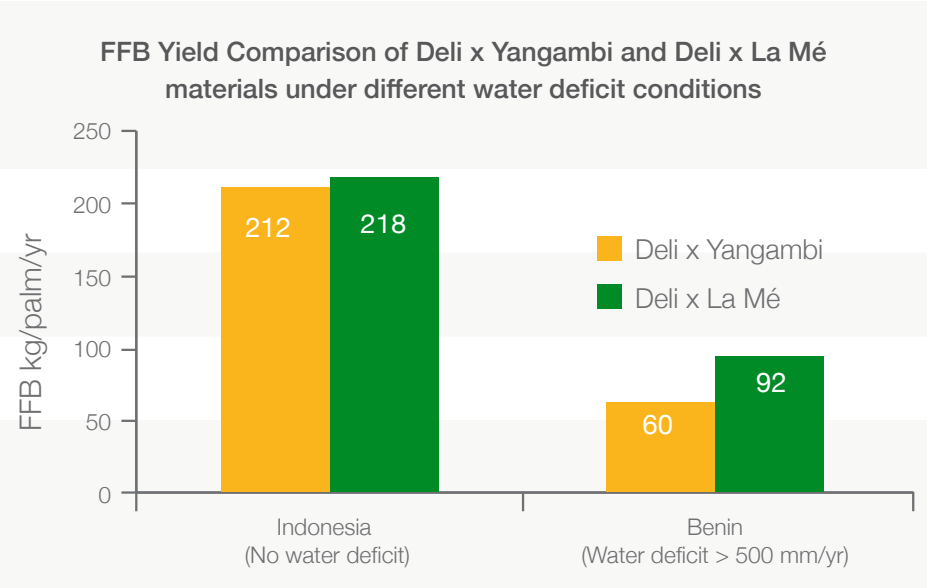


Drought tolerance

PalmElit-Cirad® Deli x La Mé planting material produces a large number of bunches.

This specific trait enables to maintain good production even in stress conditions such as drought.

When compared with Deli x Yangambi, PalmElit-Cirad® Deli x La Mé produces 53% more with 550mm water deficit.



Country of seeds origin: Benin Republic, Cameroon, Colombia, Indonesia

All PalmElit-CIRAD® seeds are produced under the scientific and technical supervision of PalmElit who guarantees the quality of seeds produced in Benin Republic, Cameroon, Colombia, Indonesia and distributed under the CIRAD® brand. Our stringent procedures guarantee growers 99.9% of tenera palms after proper culling in the prenursery and nursery. If oil palm growers follow our instructions, under normal conditions, the percentage of recovery and seedlings development in prenursery must be around 100%.

Oil composition	Indicative values
% carotene	0,077
Iodine value	55,3
% saturated fatty acids	47,4
% unsaturated fatty acids	52,6
% C14: 0 myristic acid	0,7
% C16: 0 palmitic acid	39,9
% C18: 0 stearic acid	6,7
% C18: 1 oleic acid	41,2
% C18: 2 linoleic acid	11,4

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PalmElit
Head Office:
+33 4 67 45 79 25
palmelit@palmelit.com
Bât 14 – Parc Agropolis
2214 Boulevard de la Lironde,
34980 Montferrier-sur-Lez
FRANCE

WWW.PALMELIT.COM