

The UPOV *sui generis* system and its possible application to Oil Palm (*E. guineensis*)

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Abstract

Intellectual property rights can be assimilated to a social contract with society, they are not simple exploitation rights: they must not lead to sterility. The system must encourage the inventor and the dynamics of future creation. The United States were the first to specifically protect breeder's rights with the 1930 Plant Patent Act. ASSINSEL founded in Amsterdam in 1938 was to play an essential role in defining specific rules: the UPOV (International Union for the Protection of New Varieties of Plants) convention was signed on 2 December 1961 by five countries (Germany, Belgium, Italy, Netherlands and France) in Paris. It has expanded its sphere and is now applied by 62 countries.

The UPOV system is one of the elements of intellectual property protection; it is specifically adapted to plant varieties. The aim of this system is to promote among States the merits of breeders of new plant varieties giving them a Grant of Breeder's Right. The UPOV system has few limits, but it asserts as a basic principle that the breeder's right can only be exercised once. The rights of breeders are extended to varieties essentially derived from the protected variety, to varieties that are not clearly distinguishable from the protected variety and to varieties whose reproduction requires the repeated use of the protected variety.

The minimum protection periods are 20 years for annual species and 25 years for tree species. The "Breeder's privilege" lies at the heart of the UPOV system, it is the equivalent of a patent research exemption: the purpose of the UPOV system is to protect the "gene assembling" talent of the breeder, not the genes themselves.

The breeder's right is granted where the variety is new, distinct, uniform and stable (DUS).

The two leading palm oil producing countries are not yet members of the UPOV system, it is highly likely that the situation will change. The community of oil palm breeders therefore needs to study the conditions required for oil palm varieties to be able to acquire grants of breeder's rights. They have to define the different types of oil palm varieties, and then they will need to describe them. UPOV today only recognizes descriptors that are phenotypic traits. Stable descriptors that are relevant through their ability to distinguish between varieties are needed. The uniformity of oil palm varieties will have to be judged taking into account the particularities of the species submitted to the breeder's right. Lastly, stability assumes that the breeder is capable of reproducing year after year the characteristics of the variety he disseminates.

The UPOV *sui generis* system for the protection of plant breeder's intellectual property is tending to become a global system. In this paper, we have attempted to clearly show the spirit prevailing in its development.

Introduction

Intellectual property rights can be assimilated to a social contract with society, they are not simple exploitation rights. From a philosophical viewpoint, intellectual property is based on the theory that man is his own proprietor as a sentient being. Work derived from the hands or thought of man belongs to him intrinsically (Locke in "*Les deux Traitées du gouvernement civil*", 1690). Intellectual property therefore relies on the idea that a (new) work includes part of the consciousness of its inventor.

From a practical viewpoint, acknowledgement of that property must not lead to sterility: it must go hand in hand with the invention being made available to the benefit of society. It was thus that new inventions, based on previous ones, have been able to see the light of day. Society, or the State, therefore has to arbitrate between encouraging the inventor (equitable remuneration) and the dynamics of future creation.

Consequently, intellectual property rights are granted, but limited in time and inventors must, in exchange, disseminate their "invention". However, intellectual property rights may be limited by the concept of public utility.

Acknowledgement of a temporary privilege, in exchange for dissemination of the invention to the benefit of all, is very ancient. Henry Feyt (Feyt H., 2001) quotes the example of the Greek colony of the Sybaris (southern Italy) in the 7th or 6th century BC. A text, which was remarkable for the time, protected for one year the inventors of cooking recipes, provided they were original (new) and elaborate (inventive). In the 18th century, coherent national systems of industrial property protection existed almost anywhere; they were linked to industrial activities or copyrights, they did not cover living organisms, notably plant varieties. In the 19th century, a few patents covering living organisms were issued (brewer's yeasts for Pasteur); it was clear that specific rules were needed, but a *sui generis* system was slow to come about. The United States were the first to specifically protect breeder's rights with the 1930 Plant Patent Act. ASSINSEL (the International Association of Plant Breeders for the Protection of Plant Varieties), founded in Amsterdam in 1938 was to play an essential role, after the War, in defining specific rules. In 1957, in Paris, an international conference assigned experts to prepare a Convention which was signed on 2 December 1961 by five countries (Germany, Belgium, Italy, Netherlands and France). It was the UPOV (International Union for the Protection of New Varieties of Plants) convention, which tended to expand its sphere of influence and is now applied by 62 countries.

After indicating a few general principles of the UPOV system, we examine the particular case of Oil Palm varieties.

1 – The UPOV system

1.1 – Intellectual property and breeder's rights

Article 27 (2) of the Universal Declaration of Human Rights adopted by the United Nations on 10 December 1948 specifies that " Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author".

The UPOV system is one of the elements of intellectual property protection, which comprises two major aspects: on the one hand, copyright, and on the other hand, industrial property (Diagram 1). Industrial property, which was originally limited to patents, took an interest in

all aspects of economic activity and, as technological progress was made, it was led to develop specific adapted systems. The UPOV system is thus the protection system specifically adapted to plant varieties, and as such qualified as *sui generis*, in the same way as those dealing with designs and models, computer printed circuits, etc.

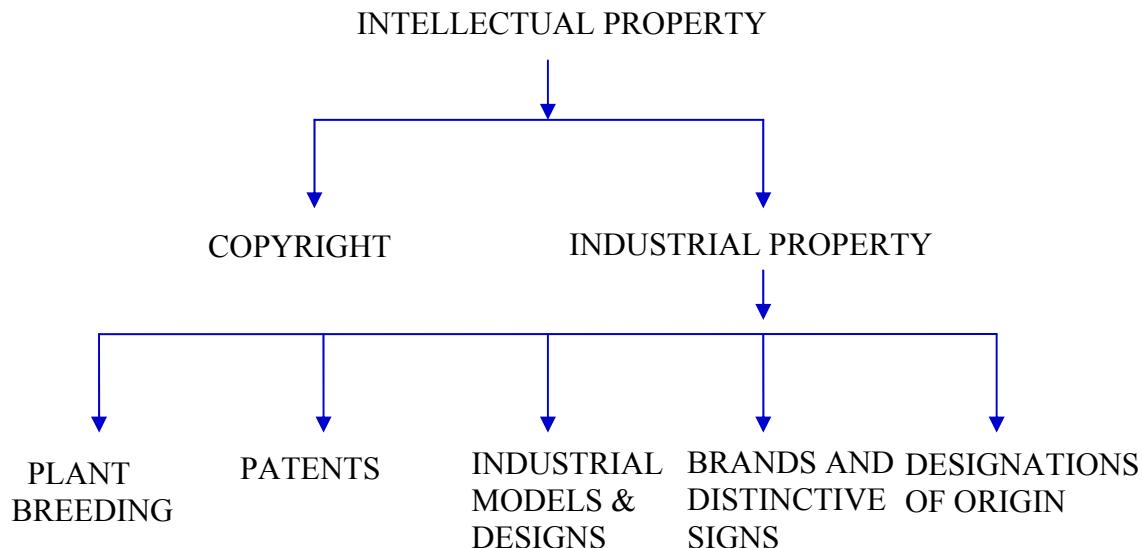


Diagram 1: Organization of intellectual property

This system was adopted by the international community with the signature of the UPOV Convention, in Paris on 2 December 1961. It came into force on 10 August 1968, and its content was modified on various occasions between 1972 and 1978 (administrative changes) and in greater depth in 1991. At that time, member countries could join either on the basis of the 1978 text, or the 1991 text, but new countries can now only join on the basis of the 1991 Convention.

Below is given the content of the 1991 text, and we shall then look at the modifications made in 1991 to the 1978 text..

1.2 - Description of Breeder's Rights (1991)

The aim is to promote among States the merits of breeders of new plant varieties. It sets in place an exclusive property right, established on the basis of uniform and clearly defined principles.

A Grant of Breeder's Right is issued, of which the beneficiary is the breeder, the breeder's employer, or the successor in title (order giver) of either of the previous two.

The breeder's right extends to all acts associated with marketing. In particular, for production, reproduction and conditioning for the purposes of reproduction or propagation, offering for sale, selling or other marketing, exporting or importing, for which it is necessary to obtain the **prior authorization of the breeder**.

That right also applies to reproduction or propagating material and may be extended to harvested material if the product was obtained through the unauthorized use of propagating material, if the breeder has not had a reasonable opportunity to exercise his right. The

principle adopted remains that the breeder must be remunerated, but only once: he cannot be remunerated when the crop is planted, then again when the product is marketed, then processed, etc.

Consequently, an optional provision, left to the initiative of each State, allows for products manufactured directly from the harvest to be subject to breeder's remuneration, if they were obtained by unauthorized use of the harvest product and the breeder has not been able to reasonably exercise his right.

When a breeder holds a Grant of Breeder's Right, his rights are extended to varieties essentially derived from the protected variety, to varieties that are not clearly distinguishable from the protected variety and to varieties whose reproduction requires the repeated use of the protected variety (e.g. maize hybrids).

The Convention is now applicable to **all plant genera and species**, and the current member States have had 5 years to comply, whilst new member States must first apply it to at least 15 genera or species and subsequently have 10 years to generalize it.

The **minimum protection periods** are 20 years for annual species and 25 years for tree species. The current tendency is to prolong that right, the privilege of the inventor used to be granted for sometimes very short periods (remember the cooking recipes which were protected for only a year).

The **territory of application** is the territory of the office issuing the certificate, the office covers a single country or union of countries. In Europe, there is one office for 25 countries: CPVO Community Plant Variety Office, in Africa AIPO, African Intellectual Property Organization, representing 16 countries from West and central Africa. Any breeder who has duly filed an application for the protection of a variety in a country (or union of countries) benefits, for the same variety, from a right of priority for a period of 12 months to extend his application to the other countries.

The member States must grant on their territory exactly the same rights to their own nationals as to nationals of third-party countries who are contracting parties to the Convention (**Rule of reciprocity between member States**). Conversely, this means that a national of a country that is not a member of UPOV may not directly file an application for protection: he must proceed via a middleman, authorized agent, delegatee, local breeder, etc.

The UPOV system has few limits, but it asserts as a basic principle that the breeder's right can only be exercised once, except for example when material of the variety is exported which would enable its production in a country not applying the protection. Lastly, the breeder's right can only be limited for **reasons of public interest**, and subject to receiving fair compensation.

1.3 – Exceptions to the breeder's right

The breeder's right does not extend to acts done privately for non-commercial purposes (e.g. in your private garden). Neither does it apply to experimental use or use for the creation of new varieties, it is the "**Breeder's privilege**". That privilege is important, it lies at the heart of the UPOV system, it is the equivalent of a patent research exemption. The purpose of the UPOV system is to protect the "gene assembling" talent of the breeder, not the genes themselves, and thereby not hold back research from any new assembly.

The "Farmer's privilege" will be described in more detail below. It concerns reproduction or propagation of the variety by a farmer for re-sowing on his own farm. That privilege is optional, each country or union of countries may or may not grant it, but it remains highly supervised by "reasonable limits and subject to respect of the legitimate rights of the breeder". For example, in Europe, that farmer's privilege covers a limited number of species quoted in the official list, primarily self-fertilizing plants (cereals: wheat, barley, durum wheat, oats, soybean, and some plants reproduced by vegetative multiplication: potato, but not fruit trees). It only applies to smallholders, i.e. those farming an area equivalent to the production of 92 tonnes of cereals or 130 tonnes of potatoes, i.e. approximately 15 hectares. That provision also applies to GM varieties.

1.4 – Conditions for the grant of breeder's right

The breeder's right is granted where the variety is new, distinct, uniform and stable. The variety must be designated by a denomination. There cannot be any further or different conditions from those mentioned above.

Novelty means that the variety has not been sold for more than 1 year in the country where the application is filed, 4 or 6 years in another country.

Distinctness assumes that the new variety differs through one or more important traits from any other variety whose existence is a matter of common knowledge on the date the application is filed.

Uniformity is judged from the particular features of the propagation of the species (hybrid varieties of pure lines, population varieties, etc.).

Stability means that the breeder is able to maintain unchanged a certain number of relevant traits after repeated propagation (for dissemination of the variety). For example the Bintje potato has remained unchanged for around 70 years.

Denomination does not raise any particular problems provided it enables identification without inducing error or confusion as to the characteristics and value of the variety, or to the identify of the breeder.

1.5 – Changes in the 1991 Convention compared to the 1978 Convention

The changes made to the 1961 text in 1972 and 1978 were minor. However, in 1991, it appeared useful to clarify certain provisions, sometimes strengthening the protection granted to breeders, and in particular taking into account the most recent technical advances (biotechnologies, international transport, etc.).

Firstly the concept of "**protectable variety**" was specified in 1978 as being any variety, irrespective of origin, artificial or natural, of the initial variation from which it resulted, but in 1991 UPOV specified that simple discovery was no longer enough. The breeder also had to have "developed his variety".

Extension of the breeder's right to **essentially derived varieties**, which we shall come back to more specifically (section 1.6), is an important addition.

In 1991, the UPOV protection system was extended to all species and the minimum period of protection was extended from 15 to 20 years for annual plants and from 20 to 25 years for tree species.

In some cases, the possibility of exercising the breeder's right on harvested products or products of primary processing was permitted from 1991 onwards.

Lastly, it was in 1991 that the farmer's privilege was explicitly acknowledged, though that provision remained at the initiative of the States and remained closely supervised.

1.6 – Definition of "essential derivation" and examples

The reason behind the concept of an essentially derived plant, introduced in 1991, was to more effectively protect breeders. However, as it is difficult to describe precisely, some examples are given to specify the spirit of the text.

A variety is deemed to be essentially derived from another variety if:

- It conforms to the initial variety in the expression of the essential traits. That expression must result from the genotype or combination of genotypes of the initial variety.
- A variety is also "essentially derived" if, whilst being clearly distinguishable from the initial variety (due to the derivation), it conforms to the initial variety.
- Varieties whose production requires repeated use of the protected variety are also deemed to be "essentially derived".

Based on those definitions, it is possible to give some examples of essentially derived varieties:

- Varieties derived from the selection of a natural or induced mutant, or from a somaclonal variant among plants of the initial variety,
- Variety resulting from a series of backcrosses,
- Transformation by genetic engineering. In this case, and by way of example, a European directive 98/44/CE on the protection of biotechnological inventions states that the (transformation) patent holder and the Grant of the Breeder's Right (variety) holder **must** meet and reach agreement.

1.7 – Participating countries

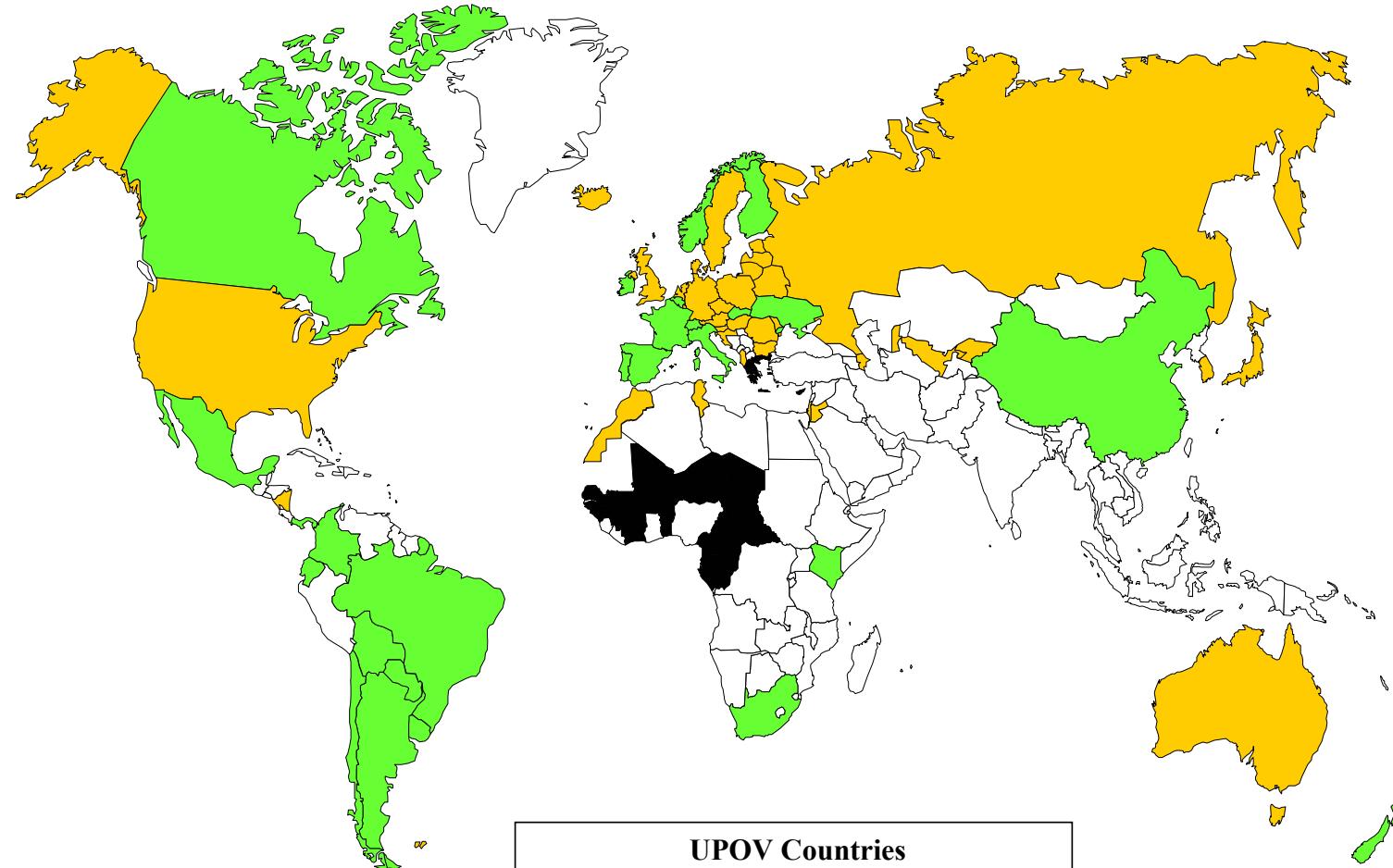
Table 1 lists the current 62 UPOV member countries. Along with figure 1, it is possible to see the scope of this convention. New countries are close to joining (India, Vietnam, Malaysia?, Indonesia?).

Table 1: List of 62 UPOV member countries (September 2006)

State/Organization	Act of 1978	State/Organization	Act of 1991
Belgium	Act of 1961/1972	Albania	Act of 1991
Spain	Act of 1961/1972	Germany	Act of 1991
South Africa	Act of 1978	Australia	Act of 1991
Argentina	Act of 1978	Austria	Act of 1991
Bolivia	Act of 1978	Azerbaijan	Act of 1991
Brazil	Act of 1978	Belarus	Act of 1991
Canada	Act of 1978	Bulgaria	Act of 1991
Chile	Act of 1978	European Union	Act of 1991
Colombia	Act of 1978	Croatia	Act of 1991
Ecuador	Act of 1978	Denmark	Act of 1991
France	Act of 1978	Estonia	Act of 1991
Ireland	Act of 1978	USA	Act of 1991
Italy	Act of 1978	Russian Federation	Act of 1991
Kenya	Act of 1978	Finland	Act of 1991
Mexico	Act of 1978	Hungary	Act of 1991
Nicaragua	Act of 1978	Iceland	Act of 1991
Norway	Act of 1978	Israel	Act of 1991
New-Zealand	Act of 1978	Japan	Act of 1991

Panama	Act of 1978
Paraguay	Act of 1978
Portugal	Act of 1978
Slovakia	Act of 1978
Switzerland	Act of 1978
Trinidad and Tobago	Act of 1978
Ukraine	Act of 1978
Uruguay	Act of 1978
China	Act of 1978

Jordan	Act of 1991
Kirghizstan	Act of 1991
Latvia	Act of 1991
Lithuania	Act of 1991
Morocco	Act of 1991
Uzbekistan	Act of 1991
Netherlands	Act of 1991
Poland	Act of 1991
Republic of Korea	Act of 1991
Republic of Moldova	Act of 1991
Czech Republic	Act of 1991
Romania	Act of 1991
United Kingdom	Act of 1991
Singapore	Act of 1991
Slovenia	Act of 1991
Sweden	Act of 1991
Tunisia	Act of 1991



UPOV Countries
in August 2006

1978 Act

1991 Act

AIPO countries

Figure 1: UPOV member countries (August 2006)

2 – The system for oil palm

Although the two leading palm oil producing countries are not yet members of the UPOV system, it is highly likely that the situation will change. Indeed, the system is in the process of becoming global. It is often quoted as a model for the intellectual protection of the world of living organisms.

The community of oil palm breeders therefore needs to study the conditions required for oil palm varieties to be able to acquire grants of breeder's rights. Work needs to be done on characterizing the different types of varieties.

2.1 – Defining the types of varieties

Several types of varieties are marketed and we have attempted to class them in a few main groups. This classification remains highly theoretical; in reality there seems to exist a sort of continuum between the different groups indicated below. No judgement of value (genetic potential) is made in this classification, but it seems important to associate it with an image of the combined genetic diversity of these varieties. That will be useful for defining uniformity and expected stability.

1. "Breeder" varieties. The material is quite simply defined by "D x P seeds from Marvellous Company Ltd". There is little to be said about them in that it is the company name that is highlighted, not the genetic origin. Strictly speaking these are not really varieties, and that may correspond to a wide diversity of situations, some of which are indicated below.
2. **Population hybrid** varieties ("origins"). In this group we could include the varieties classed by major origin, without any further details from the breeder: "Deli x Ekona" type, "Deli x Nigeria type, "Deli x La Mé" type, etc. That denomination does not exclude the selection of palms in varying numbers within each population.

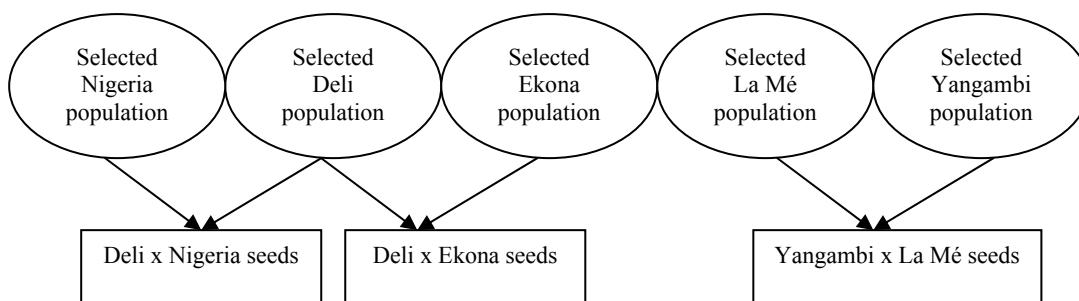


Figure 2: Example of population hybrid varieties

3. Full-sib **family hybrid** varieties. This is the case if the breeder specifies the identity of the grandparents from which the seeds of a variety are derived. These varieties can be considered as a subset of (1). For example: Deli (family DA 5 D x DA 3 D) x La Mé (family of LM 2 T self).

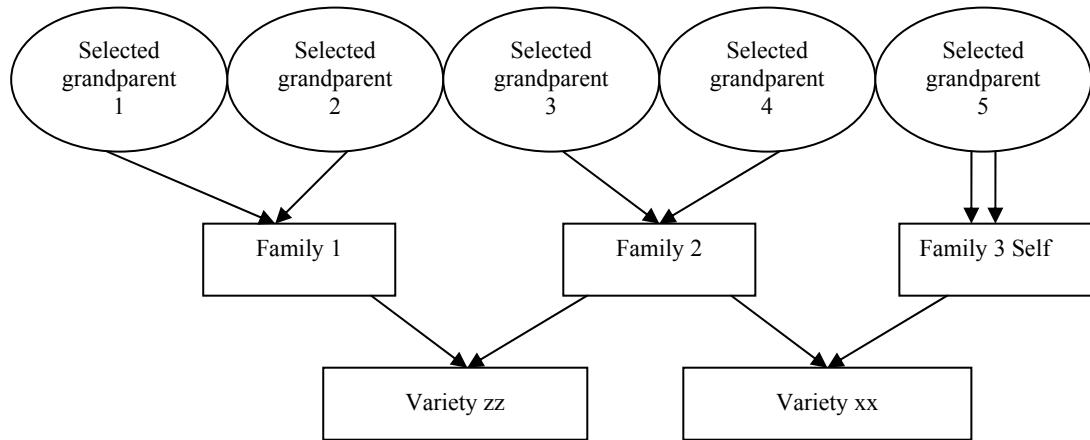


Figure 3: Example of full-sib family hybrids

In this set, it seems possible also to class varieties derived from palms selected within parental families and which have undergone a generation of further within-family crossing (self or sib). If variety zz represents a set of first cousins, it is only a sub-set of the previous set.

4. Varieties reproducing **families** (sets of full sibs). This is the case if the breeder has identified an exceptional family and has reproduced it by one of two available methods: cloning or selfing of the parents. The first method offers the advantage of enabling truly exact reproduction of the selected cross (provided a true-to-type cloning technique is available).

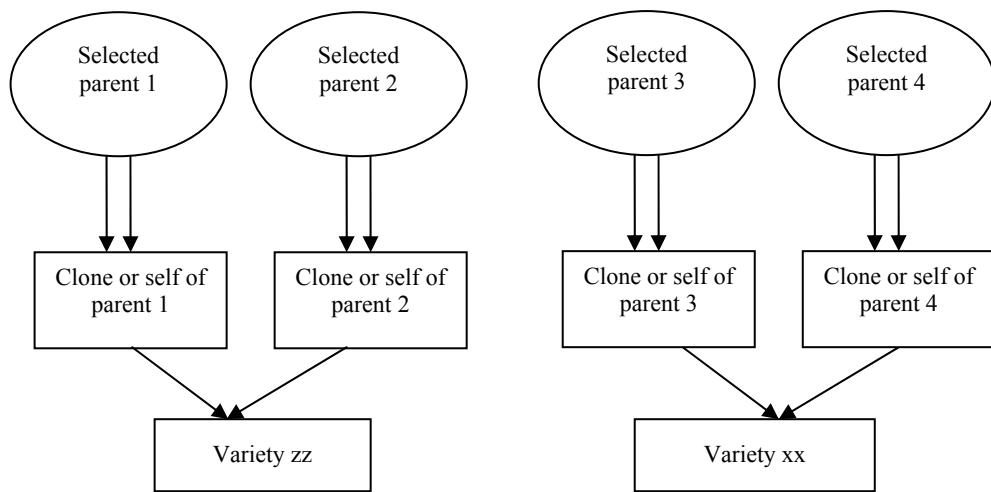


Figure 4: Example of a variety reproducing full-sib families

5. Lastly, **clones** form the final available group of oil palm varieties. Precise genotypes are involved which are reproduced by *in vitro* culture. For the moment, this type of planting material is still rare, but could become more frequent in the coming years.

2.2 – Describing oil palm varieties

It needs to be reiterated first of all that the only descriptors recognized by UPOV today are phenotypic traits. That rules out purely genotypic descriptors such as molecular markers.

When oil palm breeders create varieties they are naturally protected from counterfeits in the sense that they possess the parents. Consequently, they have never felt the current need to precisely describe the varieties placed on the market. A set of descriptors was published under the aegis of IPGRI in 1989. Those descriptors were proposed by Dr. N. Rajanaidu following the recommendation of a Working Group on Oil Palm Genetic Resources held 19-21 September 1984 (H. Corley, J. C. Nascimento, J. Meunier, C.O. Okwuagwu and Rajanaidu).

The indicators focus on different parameters such as yield, vegetative measurements, physiological traits, a description of the bunches, and oil quality. Other parameters such as resistance to diseases are also quoted.

It can clearly be seen that some of those parameters are obviously highly variable by their very nature: yield is closely linked to the environment. That type of measurement is of very little use for describing a variety. We need to find stable descriptors that are relevant through their ability to distinguish between varieties, and as easy to measure as possible (due to cost). The community of oil palm variety breeders could conduct a specific study to search for such descriptors. We could focus our efforts on parameters that, in theory, are most likely to be of use.

1. Vegetative measurements:

Length and width of rachis (at point C), length and width of petioles (at point B), number of petioles, lamina length, leaf area, etc. and any combination of those measurements such as the length to width ratio, number (of leaflets) to length (of lamina) ratio, etc.

2. Bunch analyses:

Not all the parameters are very stable, such as the fruit/bunch percentage, but it is doubtless possible to study the relevance of measurements such as the mesocarp/fruit percentage, oil/mesocarp, kernel/fruit, or shell/fruit, etc.

3. Analysis of oil characteristics:

The average fatty acid composition of an oil is probably a fairly stable character. It would no doubt be enough to describe the relative composition of four or five of the main fatty acids: palmitic acid (C16:0), stearic acid (C18:0), oleic acid (C18:1), linoleic acid (C18:2) and for kernel oil, lauric acid (C12:0).

The carotene content would probably be a useful character.

4. Enzyme systems:

Enzyme systems are considered as phenotypic traits. The study of isozymes provides good opportunities for finding quality descriptors.

This list does not claim to be exhaustive (for example, pollen grain measurements could also have been included), but it shows that it will no doubt be possible to describe oil palm varieties.

2.3 – DUS criteria for oil palm

Novelty and denomination do not raise any more constraints for oil palm varieties than they do for other plants.

For distinctness we have just shown that it is no doubt possible to describe oil palms much better. A large amount of statistical work will have to be done to define ranges (limit values) for each trait. They could be more or less narrow depending on the type of variety involved. It is by taking into account the whole set of criteria adopted that it will be possible to distinguish varieties from each other.

The UPOV system effectively takes into account the particularities of the species submitted to obtain a grant of breeder's right. The uniformity of oil palm varieties will therefore have to be judged on that constraint, but breeders will sometimes have to clarify, variety by variety, the genetic description of their new varieties.

Lastly, stability assumes that the breeder is capable of reproducing year after year the characteristics of the variety he disseminates. That constraint may oblige breeders to more effectively define the genetic background of their variety.

Conclusion

The UPOV *sui generis* system for the protection of plant breeder's intellectual property is tending to become a global system. In this paper, we have attempted to clearly show the spirit prevailing in its development.

First of all, one should see in it not just the protection of the breeder, but also of society (direct or indirect users). Indeed, the breeder's right is accorded in a temporary manner, in exchange for the diffusion of his invention and the possibility of using that invention for future developments. It seeks to be a fair balance between encouraging the inventor and satisfying the needs of society. That can be summed up by the phrase defining UPOV's mission: "To provide and promote an effective system of plant variety protection, with the aim of encouraging the development of new varieties of plants, for the benefit of society".

The 1991 Convention clearly specifies that the protection is granted after the "development" of a new variety. It is not enough to identify a new "wild" or "mutant" plant to procure a privilege.

To date, no oil palm variety has received a grant of breeder's rights. Breeders will first of all have to clarify the genetic definition of the varieties they sell. Then, a set of relevant descriptors will have to be developed for oil palm varieties. It will be no trivial matter, and we propose that an **international initiative** be taken by breeders, in relation with a UPOV ad hoc committee, to develop the system for oil palm variety description.

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ASSINSEL, The International Association of Plant Breeders for the Protection of Plant Varieties (ASSINSEL) ASSINSEL is composed of 45 individual organizations involved in plant breeding in over 31 developed and developing countries, which in turn represent more than 1,000 companies worldwide. ASSINSEL seeks to increase recognition of plant breeders' contribution to world agriculture and horticulture, and promotes protection of intellectual property rights. Secretary : Chemin du Reposoir 71260 Nyon Switzerland

E-mail: assinsel@worldseed.org URL: <http://www.worldseed.org/>

See also Arbitration Chamber of Paris http://www.arbitrage.org/us/index_us.htm.