

Some legal issues caused by identification of wild herbal plants

## Some Legal Issues Caused by Identification of Wild Herbal Plants - Interpretation and Perspectives of Patent Law -

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[Abstract]

The purpose of this article is to point out some legal issues in the context of the herbal plant patents. These legal issues may take place in relation to identification of a plant. Current DNA analysis technology of plant cells has revealed some confusion or misunderstanding involved in traditional plants taxonomy. Such a misunderstanding may make the validity of plant patents doubtful. I will suggest a possible legal resolution after having clarified the mechanism by which such legal issues would be generated.

[Key words]

DNA, identification, intellectual property, patent, plant, plant varieties, taxonomy

### 1. Introduction

In 1980 Umberto Eco wrote his best known novel, *Il nome della rosa*<sup>1</sup>. There are numerous cultivated varieties or hybrids of roses that have unique specification names. The identifier used to specify a rose is, quite simply, the name of the rose. New hybrids of roses can be created through mating between different roses which could then be distinguished by the name of the roses. A flow sheet of registered roses describes parent roses or offspring roses of a specific hybrid rose. Because the names of hybrid roses are named artificially, the name of the godparent of a specific hybrid rose can be identified and retrievable.

On the other hand, there are many artificial hybrid orchids which have been created in recent years, and in many cases wild orchids discovered newly might be used for plant breeding. To create a new orchid, different species of wild orchids (for instance, *Cattleya*, *Epidendrum*, *Phalaenopsis*, *Dendrobium* and *Paphiopedilum*<sup>2</sup>) have been mated with each other. To identify which specific wild orchid is the parent of a specific hybrid orchid can be one of the very important issues in the world of hybrid orchids. However the species belonging to the *Orchidaceae* family has evolved relatively recently in the history of flora on Earth, and this species has been and will be evolving

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<sup>1</sup> An English translation by William Weaver is “The name of the Rose” in 1983.

<sup>2</sup> See Prof. Summer’s Web Garden – World Wild Orchids  
<http://orchids.la.coocan.jp/>

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continuously.<sup>3</sup> Due to this, there are many unknown matters concerning wild orchids, and a lot of undiscovered wild orchid species may be living and flowering somewhere unknown to us. There are also many wild orchids which have not been identified concretely and remain in an ambiguous position in the plant taxonomy field, even if that specific orchid was discovered and well-known as a famous orchid. Theory on the classification of orchids has changed quite frequently and continuously so that any authoritative orchid classification book might become useless after only ten years of its being published. In addition, there have been some possibilities that orchid nurseries for commercial purpose might ship an orchid or orchids with labels or name plates attached under the wrong species name.

Moreover, what can be said about ordinary higher plants which have already been thoroughly examined since the times of Carl Linnaeus? Regarding such higher plants, it seems that every scientific name (Latin name) has already been determined and there is no doubt of the name of the plants today.

This above mentioned may present similar serious issues that pertain to patent laws. There are various patents which are related to herbal plants. For instance, a patent on the gene of a plant, a patent on a component itself extracted from a plant, a patent on a method of extraction of such a component, a patent on application of such a component including medical use or cosmetics, a patent on durability of such a component and reinforcement, a patent on cultivation method of a plant, a patent on method of removal or herbicide of the harmful plant, a patent on medical supplies and methods of neutralization of poisonous components of a plant and other related patents. Sometimes these patents may include so-called bio-patents<sup>4</sup>.

Indeed, it is very common that a scientific name (Latin name) of a specific plant is noted to identify the plant described in a patent (as patent names, patent claims, detailed explanations, examples, references or citations and so on). However, if the noted scientific name (Latin name) of the plant is invalid or false then what kind of legal effect or result will be brought about? At least, it may be possible to lose the legal effectiveness of a part of or the whole of the patents, because such an incorrect or false scientific name (Latin name) of the plant serves no function in identifying the plant, to identify any extract or components from the plant, to identify availability or usefulness of such components or to identify related methods described in the patent.

### **2. Mechanisms**

There have been many duplicated names, incorrect names, misapplication of names of wild plants. Today, some of such name have been reexamined, denied, removed or changed formally. In this section, I would like to mention about the mechanisms of such duplication and misapplication and so

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<sup>3</sup> For example, See Molecular Phylogeny and Character Evolution of Cymbidium (Orchidaceae)  
<http://ci.nii.ac.jp/naid/110004702089/en/>

<sup>4</sup> Noel Cox, *Technology and Legal Systems*, Ashgate, 2006, pp. 194-209.

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on.

### **2.1 Popular method - Identification by common name**

People have been defining the names of plants in accordance with their physical characteristics, utility or danger of the plant for many years. It seems that the popular name of a plant, which was gradually formed based on experience, was not a name based on scientific inquiry. Generally, such a popular name is called a common name. Because such a common name is not based on scientific basis, there are many weeds or trees which have the same or very similar common names, even if such plants could be classified through scientific examination as a different taxonomical family name, tribe name, sub-tribes name or species name. It is very important that the identification of a specific plant by a common name might incur some risks which would cause trouble and confusion. This is because the common name of a plant is not the same from country to country, geographical area, linguistically and other cultural factors.

However, there are not a few patents using the common name to identify a specific plant in claims or detailed explanations of the patent. There are some cases which seem to be doubtful whether or not a specific plant can be identified as described in the patents.

### **2.2 Modern botanical taxonomy**

The Swedish scientist Carl Linnaeus (1707-1778) is called the father of modern animal and plant taxonomy. He has a strong belief that 'all creatures were classified, and it must be named' and established unique classification method for the family, genus or names of animals and plants which was named *binomial nomenclature*. He applied his method to examine his herbal collection, published some great books<sup>5</sup> illustrating the application of his method. This method became the fundamental basis of current botanical studies. However, the classification of plants by Linnaeus was based mainly on the physical characteristics of plants because Linnaeus lived in an era when modern sciences had not progressed so far. In addition, there were many duplications of classification and sometimes clarified incorrectly or gave different names to different plants of the same species. Afterwards, German Adolf Engler (1844-1930) and Karl Prantl (1888-1911) made Linnaeus's system more specific and detailed, correcting mistakes and establishing a new classification system of plants. This method has been used for many years and is still in common use today. Most botanical books, guide books and illustrated books are currently descriptions based on the Engler's system. On the other hand, George Bentham (1800-1884) and Joseph Dalton Hooker (1817-1911) developed another plant classification system with Engler, and there have been many books based on Bentham's system mainly in the United Kingdom and the United States.

In the history of plants classification before DNA analysis generation, the newest and most correct

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<sup>5</sup> *Systema Naturae*, 1758

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method is the classification system which American Arthur John Cronquist (1919-1992) established. However, the systems established by Engler, Bentham and Cronquist were their own theoretical botanical systems. Application of these systems to individual living plants was completed by many scientists who were located in each nation<sup>6</sup>. Besides, botanists of each nation had to examine and apply their classification systems by themselves independently because of the physical distance separating them before the age of the Internet. Therefore, much duplication has taken place. For example, while a species might be described as *Plant A* in the United States, the same species might be described as *Plant B* in Japan which was a different plant from *Plant A* in the United States.

In addition, generally human society cannot catch up with the newest theories as quickly as modern science progresses. It is impossible to recall all the books written based on an older theory and to rewrite it based on a newer theory. Therefore, there are many cases where description of plant classification in a book is really incorrect under the newest scientific theory, even if the description was once believed correct. In plant patent area, even if a plant name in a patent claim was described correctly based on the correct classification system of the time, such a description became incorrect or wrong in some years later due to the progress or change of scientific theories or newer discoveries. There are a myriad of such issues.

### 2.3 DNA Analysis

The most correct classification method at present is one based on the difference of DNA sequence of plants.

This is called molecule taxonomy. Angiosperm Phylogeny Group (APG)<sup>7</sup> promotes this method. According to the knowledge provided by this method, it became clear that there were considerably many mistakes in previous plant classifications. In other words, it suggests that the classification in books based on traditional methods might incorrect.

In fact, recently, some important changes have been taken place in plant classification based on the molecule taxonomy and many plants are now being re-classified. As a result, it has become impossible to correctly identify a specific species based only on the popular common name and even traditional scientific names (Latin names) including family names and genus names of plants.

To identify a specific species or groups of species through plant DNA, it is necessary to use a DNA taxonomical ID which can identify a specific DNA of the plant or groups of plants. However, such a DNA taxonomical ID is more difficult for ordinary people to peruse than the popular common names or traditional scientific names (Latin names). This is closely similar to a relation between an IP address and a domain name on the Internet.

Moreover, a uniform system for such DNA taxonomical ID has yet to be firmly established. In

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<sup>6</sup> Tomitaro Makino (1862 - 1957) examined and classified many plants in Japan based on Engler's system. He published *Illustrated Flora of Japan*.

<sup>7</sup> <http://www.mobot.org/MOBOT/research/APweb/>

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addition, DNA analysis of every plant itself has not been completed yet at present. Many more years are needed to complete DNA analysis of every plant on Earth. Due to this, we have no complete flow sheet of plants based on DNA analysis.

Therefore, it seems to be very difficult to specify a plant through DNA analysis based on taxonomical ID in the case of patents. People may still have to rely on a more incorrect way than DNA based identification in the years to come.

### **2.4 Nationalism and lack of information**

In Asian countries, including Japan, the introduction of modern scientific plants taxonomy was quite late for various historical reasons. In this area, plant classification based on incorrect information has often occurred. At the same time, many domestic plants have been classified as endemic species, due to nationalistic sentiments.

In the case of Japan, the Swedish botanist Carl Peter Thunberg (1743-1828) and German doctor Philipp Franz von Siebold (1796-1866) were the earliest botanists who visited Japan in the Tokugawa era (1603-1867) and examined Japanese wild plants. Their research results have been the starting points of Japanese botanical science and plant taxonomical classification until today. However, Japanese scientists had been strictly prohibited from learning modern European science until 1868 when the Tokugawa era came to an end and the Meiji era (1868-1912) began. In the Meiji era, the Japanese government introduced modern European science to make Japan an advanced, modern nation. However, at the same time, nationalism grew in Japan and some botanical scientists began classifying Japanese domestic plants as endemic plants. Many such classifications were not correct, because they were influenced by nationalistic sentiments. The exchange of scientific knowledge between foreign nations and Japan was once again closed until the end the World War II. It had been quite difficult for Japanese botanical scientists to read the latest scientific literature at this time. This period should be thought of as a period of a lack of a flow of information.

### **2.5 Misunderstanding or misreading**

Over the years there have been numerous incorrect classifications made especially of nationalized plants. This is because correct information of newcomer nationalized plants can not be disseminated from the native country of the plant. This may be considered another example of a lack of information on plants as mentioned above.

### **2.6 His/her honor**

In the case where a person produces a doctoral thesis based on older theories and receives a doctoral degree and the accompanying honor, such a person may not agree with an opinion which can deny

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the older theories and the honor of the person.

This is not scientific thought at all. It can be said that a human being is an existence which has an unreasonable emotion.

And if the person has authority and prestige in the botanical science field then new theories (often more correct than the older theories) may occasionally be denied or ignored giving consideration to the honor of the person.

Judgment on the identification of a plant or on a plant patent in a court trial may be influenced by such unreasonable emotion of the person who gives witness or evidence as a famous botanical scientist.

Sometimes it may be the most difficult matter for every specialist to deny the own unique idea made by him/her.

### **2.7 Judgment and recognition based on subjective observation**

On the other hand, there is a fundamental problem for botanical taxonomical science itself.

Generally it seems that the botany constitutes a part of the natural science and based on mathematical accuracy. However, it is not right.

Because a plant is a physical existence, it can be observed objectively and the observation results can be recorded. However, from Linnaeus to Cronquist, the traditional botanical taxonomical science has been based on observation of outlook of plants. Also due to that judgment to classify a specific plant has to be done based on observation of the plant by botanical scientists and that every judgment should be performed as a result of subjective thinking in human brain, the judgment might be subjectivity.

Even in a case of DNA analysis based classification, a part of the classification may be subjective, because only small part of DNA sequence is important to distinguish one genus or species from the other genus of species. For instance, in the case of a human being, details of his DNA structure of a man who has great mustache is not equal to the DNA structure of another man who has no mustache. But such a tiny difference between their DNA sequences has no meaning to judge whether a being is *Homo sapiens* or other animals.

This is completely same in the botanical taxonomy field. Botanical scientists may be interested only in an important part of DNA sequence of a plant to judge the difference of the family, genus and species of the plant, but not of individuals belong to the same species. The minimum standard which can define the difference of the species may be decided based on the subjective examination by botanical scientists. Therefore if the standard has been changed subjectively then the classification of the plant may be changed too. Thus it should be remarked that plants classification itself is not a physical material but is a changeable description after a subjective examination by human.

Because of that every plant name described in a plant is identified based on such a changeable and

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subjective classification process, legal validity of the patent may be floating too.

### **3. Legal issues**

There are various types of herbal plant related patents.

Issues on identification of a specific plant may affect the legal validity of plant related patent of all these types. These legal issues can be examined in accordance with a difference of patent types. I would like to suggest some issues which may be important for the examination of patent claims and court trials.

#### **3.1 Validity/invalidity of a patent**

A specific plant described in a patent should already actually exist on Earth. A patent of no existing plant is wholly meaningless as an application of natural science. Also it is impossible to examine the integrity and utility of the patent. Therefore such a patent is or will be obviously invalid as a plant related patent.

For instance, let's assume that there is a genome patent which patent claim consists of a gene or DNA of a certain herbal plant. In this case, the gene or DNA itself should be specified by an amino acid sequence and the name of the herbal plant is identified by scientific name (Latin name) in general. However, if the description of the scientific name is incorrect or false or if the existence of the plant was denied by new scientific investigation or discovery after the issue of a patent, then the patent would be a curious patent in which no existing plant name is described in the patent at all.

If an amino acid sequence itself described in a patent is correct and identified by the name of the amino acid sequence then the patent may be valid partly as an amino acid sequence patent indeed. However, in this case also, the remaining part of the patent which consists of non-existing plant should be invalid. In the case of a patent on method of a composition (including an amino acid sequence) extraction from a specific plant, if the plant name is incorrect or false then the patent should be wholly invalid. This is also same and true even if the name of composition (or amino acid sequence) is correct and such a composition (or amino acid sequence) actually exists. Because any plant which does not exist can not create any component at all, and can not consist of any method of extraction of the component.

Similarly, on utility of patents, if a plant described in a patent does not exist on Earth then the utility of the plant should be denied. For instance, in a case of herbicidal component patent which is described as effective to kill a specific herbal plant but the described plant does not exist in fact, such a patent has no utility as the described herbicidal product. Such a patent may be invalid wholly or partly.

#### **3.2 Doctrine of equivalents**

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In the interpretation of patent claims, the doctrine of equivalents can apply to judge whether or not one specific plant and another specific plant are same. This doctrine which was created by the United States courts<sup>8</sup> at the first stage has been accepted by many jurisdictions and enhanced its applicable area to various types of patent trial cases<sup>9</sup>. In such cases, legal issues on the superiority and inferiority between different patents shall be judged by the court.

However, this doctrine may cause some legal issues which are very difficult to be resolved.

### 4. Legislative issues

A similar issue may take place not only with wild herbal plants and their components but also with artificially made plants produced mating or genetic recombination technology.

Concerning the new varieties of plants, the major nations, including the United States and Japan, have agreed with or have ratified the *International Convention for the Protection of New Varieties of Plants* (UPOV, 1961)<sup>10</sup>. The Convention was amended in 1991. After the amendment, double protection of a new variety of plants may be permitted in a particular jurisdiction. For instance, new varieties of plants can be protected both by the Patent Act (35 USC) and the Plant Variety Protection Act (7 USC 2321 et seq.) in the United States, and both by the Patent Act (Act No. 121 of 1959) and the Seeds and Seedlings Act (Act No.83 of 1998) in Japan<sup>11</sup>. These laws have different legislative purposes. The scope and methods of legal protection of these laws are different as well. However, it should be clearly remarked that double protection on the same new variety of plants may be given in fact under the patent or other intellectual property protection laws. As a matter of possibility, such a double protection may cause unfair trade or other illegal situations mainly on the international level. Only one way to avoid such a double protection is to register and examine the gene information or DNA sequence data of the registered new variety of plants. Also such registered gene information or DNA sequence data has to be able to be easily accessible worldwide.

### 5. How to avoid legal disputes

#### 5.1 Importance of uniform ID system

Today, descriptions using DNA sequence data seem to be the most certain way to identify a living species. It has been believed that DNA sequence is different according to family, genus and species of a living being. Therefore, under this belief, if plant A has the same DNA sequence as plant B

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<sup>8</sup> US Supreme Court, *Festo Corp. v. Shoketsu Kinzoku Kogyokabushiki Co.*, 535 U.S. 722 (2002)

<sup>9</sup> On similar court judgment, See Japanese Supreme Court, case number 1994 (O) No.1083  
<http://www.courts.go.jp/english/judgments/text/1998.02.24-1994-O-No.1083.html>

<sup>10</sup> UPOV  
[http://www.upov.int/index\\_en.html](http://www.upov.int/index_en.html)

<sup>11</sup> See Translations of Laws and Regulations in the Web Site of the Japanese Cabinet Office on official English translation of Japanese legislation.

<http://www.cas.go.jp/jp/seisaku/hourei/data2.html>



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then plant A has to be regarded as the same species as plant B, on the contrary, if plant A doesn't have the same DNA sequence as plant B then plant A has to be regarded as a different species from plant B.

However such an explanation is a bit incorrect. Of course, to be more correct, the whole DNA sequence of a specific living plant is a mixture. A part of DNA sequence can be used to identify the family, genus and species of the plant and another part has no relation to identify them. But, the integrated basic scientific theory to separate these parts of DNA sequence of every living being on Earth has not yet been established.

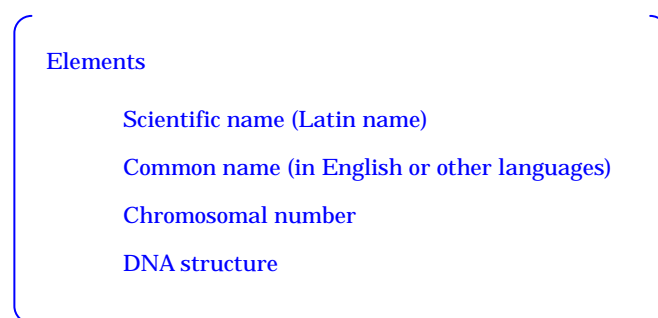
In addition, even if it is possible to use a DNA sequence (an amino acid sequence) as identification for a specific herbal plant, it is reasonable to process such sequence data in computer systems but it is not suitable at all for memorizing and use by human beings. Of course, ordinary people can not imagine physical appearance of a beautiful flower when he/she is informed a description by pure DNA sequence data without any information on common names and scientific names (Latin names) of the plant.

Therefore it seems completely doubtful to believe that DNA sequence can be used to easily identify every specific species on Earth. This has to be clearly remarked.

### 5.2 Structure of the ID

In general, the identification of a plant has a logical structure which consists of some elements as mentioned below. Of these elements, the description of the DNA structure can not be duplicated, even if other elements may be duplicated. There are many duplications of description on scientific names (Latin names), common names and chromosomal number counts, because they have been named and renamed by several different people over many years. Depending on language, social culture, people's preference and the history of the society; there have been numerous duplicated names of plants. However, the DNA sequence is a pure and definitive physical existence.

#### ID number



Some database systems may be established by using such identification system in different

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jurisdictions independently. Therefore the most important matter for the ID system of plants is a relational data linking mechanism to bind any and all element data recorded in such a database which can indicate the correct DNA structure to identify a specific plant correctly. If such a linking mechanism can be established on the Internet then everyone can use this database system to find the common name or scientific name of a plant. The computer system in the database system could thus retrieve and compare every element of relevant data recorded in database systems worldwide through the Internet. Subsequently, the system would provide a linking table based on DNA structure element data of the plant as an internal key to retrieve and sort data. It would thus be able to retrieve every synonym and name using such a database system. In addition, such a linking database system would provide a tree-structured table through which people could identify parent plants or closely relevant plants of a specific plant on the gene level<sup>12</sup>.

If such a database system and uniform ID system would be established then no lawyer, judge or patent examiner would misunderstand the name (identification) of the plant<sup>13</sup>. One would thus be able to find the name of the rose correctly.

### 5.3 Management

If such a uniform ID system can be developed, deployed and used commonly then the most important issue may be who would be responsible in managing this system<sup>14</sup>. If a specific government or private company would manage the ID system, such a management organization might prefer to adopt an unjust management style to ensure their own economic profit or status. In addition, in a worst case scenario, if such an organization would be able to govern the database systems of the ID system then the organization would be able to succeed in governing every intellectual property right relating to wild herbal plants on Earth. It might be a tradeoff to resolve the critical legal issues mentioned above. However, we have to give careful consideration to and also examine carefully what entity should manage the ID system. It seems that the most suitable way to manage this ID system would be to have it managed by a neutral international organization such as the United Nations or other responsible and relevant international organizations.

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<sup>12</sup> Due to such important function, such database system can not be used to retrieve human gene data. Human gene data is one of the most important sensitive data to be protected. On human gene data, EU Personal Data Protection Directive (95/46/EC) and other similar international and domestic laws shall apply.

<sup>13</sup> New technology has large possibility to change the roll of lawyers. See Richard E. Susskind, *The Future of Law: Facing the Challenges of Information Technology*, Oxford University Press, 1996, pp. 265-292.

<sup>14</sup> See Simson Garfinkel, *Database Nation: The Death of Privacy in the 21st Century*, O'Reilly & Associates Inc., 2000