

10:31 AM Feb 18, 1997

BIO-PIRACY PATENTS INCREASE IN US

Geneva 17 Feb (Chakravarthi Raghavan) -- The "patent plunder" of indigenous knowledge and genetic resources of the South continues, with intellectual property rights (IPRs) being used by transnational firms to gain exclusive monopoly control of food crops, medicinal plants, soil microbes and traditional knowledge from the South, according to the Rural Advancement Foundation International (RAFI).

In its monthly bulletin (December 1996), Rafi Communique, the Ottawa-based international environment/development NGO says that biopiracy and bioprospecting don't just happen in the field, but is even more likely to take place in laboratories of industry and academia, and in patent offices of the industrialized North. RAFI, which since 1994 has been monitoring this area and maintaining a list, says the number of private and public enterprises or their intermediaries engaged in bio-piracy now exceeds 50.

Biopiracy refers to the use of IPR laws (patents, plant breeders' rights) to gain exclusive monopoly control over genetic resources that are based on the knowledge and innovation of farmers and indigenous peoples.

Current intellectual property systems do not protect interests of community innovators and ultimately threaten conservation and improvement of bio-diversity worldwide.

Some recent examples of such bio-piracy, according to the RAFI communique, include patenting in the US of the Bolivian quinoa plants, a source of high protein food, and several traditional medicinal plants of India known since antiquity, and used in indigenous medicine, to treat a variety of diseases and disorders.

The Bolivian plant quinoa is a high protein food crop that is an important part of the diet of millions in the Andean countries, specially the indigenous people. Since pre-Inca times, says RAFI, the indigenous people in Argentina, Chile, Bolivia, Peru and Ecuador have been developing varieties of quinoas suitable for a wide variety of harsh conditions in the Andes, in particular varieties that could tolerate high altitude, low temperatures, little rainfall and poor soils.

But it is only in recent years that quinoa has entered the US and European market place as a little known, but increasingly popular, "ancient grain" that is exceptionally nutritious. Barley, maize and rice have less than half the protein of quinoas.

Current quinoa consumption in the US is estimated at about 3 million lbs a year, and most of it is imported from Bolivia where it is grown by the Bolivian campesinos and the export market for Bolivia is about one million dollars a year.

But in 1994, agronomists Duane Johnson and Sarah Ward of Colorado State University received a patent (US patent No 5304718) -- giving them exclusive monopoly control of male sterile plants of the traditional "Apelawa" quinoa variety and its use in creating other hybrid quinoa varieties. Apelawa is a highland variety from the Lake Titicaca region of Bolivia.

Johnson readily admits that he and Sara Ward did nothing to create the male sterile varieties. "It's part of the native population of plants, we just picked it up," Johnson explains.

Johnson and Ward's patent claims they were the first to identify and use a reliable system of cytoplasmic male sterility in quinoas for the production of hybrids. To produce cytoplasmic male sterile quinoa plants they visually selected naturally-occurring male sterile plants from the Apelawa variety, and then crossed these with fertile quinoa plants to achieve a male sterile hybrid.

This type of sterility affects only pollen production, not the seeds produced. It is the same type of system used to breed hybrids in crop species such as maize, sugar beet and onion.

But the US patent claim is not limited to a single hybrid variety: it claims any quinoa hybrid that is derived from Apelawa male sterile cytoplasm and, according to the patent, this includes, but not limited to, some 35 traditional Andean varieties -- such as Apelawa 407, Cahuil, Tango, Janco, Kanchi, Baer, Calcha, Chullpe, Killuvirginiana, Lihio, Marangani, Isluga, Sajama, Chuppi Kanccolla, Blanca de Juli, Rosada de Junin, Blanca de Junin, Illimani, Oxfam, Tupiza, Ccoyta 1, Chewecca, Ral, Pasankalla, Litu, Pichaman, Faro, Amarillo de Marangani, Dulce de Quitopamba, Lipez, Lirio, Rojo de Cusco, and Tanso Kanta.

The patent also makes specific reference to claims extending to hybrid quinoa plants cultivated from quinoa germplasm collection of the Universidad nacional Tecnica del Altiplano in La Paz.

In accordance with the patent requirements, seeds of the traditional Bolivian Apelawa variety are now on deposit at the American Type culture collection.

Johnson told Rafi that he has already made his technology for producing hybrid quinoa freely available to researchers in Chile and Bolivia and that he has no intention of enforcing his patent outside of the USA. He however adds, "if they start taking away my market in the United States I might start to be concerned."

Under US patent laws, Johnson and Ward have the right to prevent anyone else from making, using or selling quinoa hybrids derived from Apelawa cytoplasm without permission and payment of royalties. Technically, the 'inventors' have the legal right to prevent US imports of hybrid quinoa from entering the US if they were created using their patented technology, and the right to prevent other researchers from using Apelawa germplasm to create quinoa hybrids -- even for non-commercial purposes.

Johnson claims he is already freely distributing his invention to research scientists. So why did he patent Apelawa and the technique for developing quinoa hybrids.

"Frankly," says Johnson, "it is because the University likes us to patent this kind of technology -- patenting is just one of the procedures.

The primary goal of developing hybrid quinoa is to increase the crop's yield, and to make it suitable for commercial-scale cultivation in North America. The patent claims that the new hybrid varieties are capable of producing yields three times the average of 1344 kgs. per hectare. Ironically, if a larger market for quinoas is developed in the US for high yielding hybrids derived from a traditional Bolivian variety, it could displace Bolivia's export market in the US.

Whether or not the patent has any direct impact on Bolivia's farmers, there is no denying that they have effectively lost control of traditional quinoa seeds that were developed over centuries by indigenous peoples of the Andes -- a dangerous and disturbing precedent, comments RAFI.

Bolivian scientists have also raised other concerns.

Quinoa crop has an outer coat of bitter-tasting compounds, known as saponins -- believed to protect the crop against insects, but must be removed after harvest - a costly and time-consuming process that has so far hindered industrial processing.

Johnson is now trying to develop saponin-free varieties without the bitter seed coat. This is giving rise to fears that new varieties could become more vulnerable to pests, and eventually would require the application of expensive pesticides.

RAFI says that the German agrochemical and pharmaceutical giant, Hoechst, now holds at least six US patents for numerous uses of chemical compounds extracted from the roots of an Indian medicinal plant, *Coleus forskohlii* - used since antiquity in Hindu and Ayurvedic traditional medicine.

Traditional uses include treatment for cardiovascular disease, abdominal colic, respiratory disorders, painful urination, insomnia and convulsions.

One Hoechst patent (issued in 1993) covers a specific formula of the plant extract and its use in treating cardiovascular disease and intra-ocular pressure. Three other patents are also held by Hoechst on use of extracts of *C.forskohlii* to treat cardiac failure and memory deficit. Another Hoechst patent claims a process for isolating the biologically active compounds from the plant, and its use in treating anti-inflammatory and analgesic activity. Beginning 1997, the drug is set for worldwide marketing.

But the age-old medicinal uses of 'forskolin', the biologically active compound, is not new. In 1974, RAFI says, a large-scale screening of medicinal plants by the Indian Central Drug Research Institute first revealed the blood pressure lowering and antispasmodic effects of extracts from *C.forskohlii*.

According to German researcher, Michale Flitner, cited by RAFI, Hoescht is doing intensive research on soil samples and traditional Ayurvedic medicine from all over India. It has already screened over 90,000 samples and is building a new,

high-efficiency screening system in Frankfurt to sift through the plant and microbial diversity of Indian origin.

AgrEvo, a new company established in 1994 when Hoechst and Schering merged their agrochemical businesses, to form the world's fifth largest agro-chemical corporation, has patented genes for herbicide tolerance. These patented genes come from a strain of *Streptomyces viridochromogenes*, isolated from a soil sample from Cameroon. The company's glufosinate chemical compound, used in its best selling herbicide (trade name Basta) also was developed from a soil bacterium of Cameroon. Though it originated in Cameroon, the German paper *Die Zeit* quotes Hoechst spokesman for the statement "nothing will go back to Cameroon."

In another instance of bio-piracy, RAFI reports the patenting by two University of Mississippi Medical Centre scientists - Suman Das and Hari Har Cohly -- who have patented a traditional remedy of Indians for centuries: the use of turmeric to make external wounds heal faster. The US patent, issued on 28 March 1995, claims a "method of promoting healing of a wound by administering turmeric to a patient afflicted by the wound."

But turmeric, known in India as haldi, has been used as an important remedy in traditional Ayurveda medicine since antiquity. The yellow powder or paste from the dried root of the plant (*curcuma longa*) is routinely applied to scrapes and cuts of children.

In India, the news of this patent claim on turmeric produced an outcry and the Indian government's Council of Scientific and Industrial Research has responded by requesting a re-examination of the patent at the US Patent Office in Washington. The Indian government is to argue that the use of turmeric as a wound healing substance is a well-documented traditional practice and therefore the inventors cannot claim their "invention" is novel - one of the three requirements for patentability.

However, one of the 'inventors', Hari Har Cohly, told RAFI, that he hopes to "carry on" with the patent, but a final determination is yet to be made by his co-inventor and the University, which is concerned about the cost of defending the patent.

Cohly is cited by RAFI as saying "Never did I imagine that we would get such controversy." RAFI adds that Cohly said he is "familiar with the traditional uses of turmeric, but he doubts the legitimacy of traditional knowledge until tested (and patented?) by institutional scientists".

"There are so many home remedies all over India," Cohly said. "But are these scientifically valid or just gibberish? That's the point. We have used it (turmeric) on patients; it has been clinically tested."