THE NEEM.

The Neem (Azadirachta Indica[1]) is a holy tree with a lot of skills. It comes from the East Indies and more precisely from the South of the Himalayas.

Some drops of the celestial nectar fall from the firmament.
A plant becomes impregnated while welcoming them.
The power building its future,
Its vocation is born:
Sithala, the goddess stays to live in the Neem.

Oral Tradition[2].

A text of traditional medicine (*Brihat Samhita de Varahamihira*) even recommends planting a Neem tree near each house. The Hindu holy texts are about the *sarve roga nirvarini* which means: "the one who cures every disease". In popular speech, the Neem is called: "**the village's pharmacy**"!

The Neem (Azadirachtina Indica) is a tropical tree. It is part of the Mahogany family; it is a cousin (name of a family tree of the equatorial areas).

Adapted to the poor soils, it tolerates high temperature as well as a low pluviometry. We find it in dry and semi-dry areas of Tropical Asia but also in Africa and Australia. Today, we cultivate it more and more in Central and South America (in Mexico), in the West Indies and even in Europe (The French Riviera) where it is appreciated as a charm tree.

The Neem grows quickly; it can reach 20 meters high and live 200 years.

Its *pennata* and lightly dentate leaves look a little like the ash tree's ones (*Fraxinus excelsior*) and a lot like the soap tree's ones (Sapindus Mukorossi). Its bark is brown and vertically fissured.
From May, some smelling, purple star-shaped flowers appear in the tree and they are arranged in descending cluster. They are transformed into edible little yellow fruits (which look like little apricots) that we harvest at the monsoon. Then they are dried in the sun before being ground.

More infos:
The kernel taken from the seed is transformed into Neem oil. The Indian farmers use this oil as a fertilizer, an insecticide and a pesticide[3].

Neem tree, beads tree, Indian Lilac because of its purple flowers (do not confuse it with the *Lagerstroemia Indica* which is also called Indian Lilac)

The pluviometry, between 400 and 1200mm, can content itself with less if the level of the ground water is high enough. It adapts itself to sandy or drained soils (PH 6, 2-7, 0) but also to the poor soils. Favourable temperature to its development: 21°C to 32°C. It tolerates very high temperature but not below 4°C.

When the tree reaches maturity, it can produce until 50Kg of fruits what is equivalent to 30Kg of seeds. These ones constitute the main source of components with some insecticidal properties as the azadirachtin. However, the quantity of azadirachtin contained in the seeds considerably changes according to the climatic conditions, the soil conditions and the genotype of the tree.

1. http://en.wikipedia.org/wiki/Neem
2. http://www.plantcultures.org.uk/plants/neemspiritual.html
http://www.ulb.ac.be/inforsciences/actisciences/dossiers/biopiraterie/margousier.html

Specification sheet of the Neem.

Classification chart.

Le Neem.	
 The Neem Tree	
Azadirachta Indica.	
Classical classification.	
Vegetable kingdom	*Plantae*
Division	*Magnoliophyta*
Class	*Magnoliopsida*
Sub-class	*Rosidae*
Orders	*Sapindales*
Family.	*Meliaceae*
Types.	*Azadirachta*
Etymology	– Neem tree, beads tree, Indian Lilac because of its purple flowers (do not confuse it with the *Lagerstroemia Indica* which is also called Indian Lilac) – Neem tree, Indian lilac, Margosa tree, Persian lilac or China berry – Proper nouns in India: Nim, Neem, Balnimb (Hindu), Nimba (Sanskrit), Vepu, Vempu, Veppam (Tamil), Vepa (Telugu), and Limba (Gujarat).
Active components of the Neem oil.	Free fatty acid (as oleic), steraic, linoleic, palitic, myristic.

The Neem Properties.

To protect themselves from the attacks of insects, a lot of plants produce some chemical substance with several properties: toxic, insects' growth regulator or anti-nourishing.
The Neem produces with its fruits, leaves, flowers and barks more than a hundred of chemical substances. One of them (Azadirachtin) is one of the most effective bio-insecticide.

FOR THE PLANTS:

In emulsion with some water and by pulverization, the Neem oil is used as:
- a fertilizer for the foliages
- a stimulator of natural defences
- a pesticide
- an insecticide

Its ovicid and larvicid properties allow him to infect the laying of arthropod females as well as the moulting and the growth of the larva, thus weakening the resistance of these insects.

The Neem oil is not toxic for the warm-blooded animals and the human beings.

The Neem's natural components allow some various applications:
In the farm and forest production, the Neem oil sets different effective processes which are respectful to the environment for the plants that need:
- pesticides (parasites)
- fungicides (mushrooms)
- insecticides (insects)

The organic action of the Neem's extracts is good to fight against more than 400 pests of which some are hardy to the chemical pesticides.

The efficiency of the Neem oil was experimented in laboratories, in greenhouses and in the fields[4] on:

- *Tetranychidae* (le tétranyque à deux points): in laboratory.
- The greenfly of the peach tree (*Myzus Mercicae*) and the *Trialeurodes Vaporariorum* (aleurodes des serres), often called the white fly: in laboratory.
- The thrips (*Thysanoptera*) of the little fruits: in laboratory and greenhouse.
- Potato leaf roll virus (PLRV) and potato virus Y: in greenhouse.
- The mites, greenflies, *Trialeurodes Vaporarium* and the black flies: in greenhouse.
- French beans against the bean flies and the locust: in the fields.
- Watermelons against the fruit flies: in the fields.
- Tomatoes against tomato fruit worms, whiteflies, thrips, cutworms (voracious leaf)…: in the fields.
- Strawberries against the tarnished plant bug (la punaise terne): in the fields.
- Broccolis, rutabagas (Swedes), radishes and cabbages against the cabbage flies (*Delia Radicum*): in the fields.
- Onions against the onion flies (*Delia Antiqua*): in the fields.
- The rosemary against the mites, white flies, thrips and the *Eupterix Decemnota*: in tunnel.
- Strawberries against the strawberry tree's powdery mildew: in laboratory.
- The apple tree against the *Disaphis Plantaginea* and cutworms: in an orchard.

FOR THE MEN:

- In the allopathic and homeopathic medicine as well as in the Hindu traditional **medicine**, the Neem extracts are used for several pathologies, dermatological, breathing, digestive…treatments. The Neem also has some antiseptic properties.
- In the **cosmetic industry**, the Neem oil is mixed in creams, body oils, shampoos, repellents, sun creams and toothpastes.
- For the **housing**: The Neem oil considerably allows reducing the presence of mosquitoes in the houses.

[4] Research and development centre in horticulture.

FOR THE ANIMALS:

For the hygiene and the veterinary treatments: the sprayed Neem oil allows disinfecting the stables and the cowsheds with its fumigating action. In a shampoo, it is used as a repulsive and as a care for the hairs.

More information:

The fertilization of the leaves consists in spraying the fertilizer straight away on the vegetables' foliages. The effect of this type of fertilization is very fast because the nutriments are immediately assimilated and used by the plants. The fertilization of the leaves is especially useful after moments of stress (transplantation, the wind, the hail, the cold, the dryness and the heat) or in the case of serious nutritional deficiency. It is mostly used as an extra-fertilization and settles a problem of deficiency in a short-term period. For a solution in a longer-term period, it is important to fight the reason of the imbalance. For instance, if the mineral deficiency is a result of a too acid pH, we need to mix some enriching agents into the soil. The nutritious elements contained in the fertilizer get into the leaves through tiny openings called stoma. These ones are generally more numerous on the inferior side of the leaves. We have to take it into account during the application of the fertilizer and spray underneath the leaves. The fertilizer for the leaves is better swallowed if it is applied very early in the morning or in the evening because the air is fresher and the ambient humidity is higher what favour the opening of the stomata.

Arthropods (Greek: "arthron" means "joint" and "podos" means "foot", also called "jointed") form a phylum of invertebrate animals. Arthropods are characterised by the possession of a segmented body with appendages on each segment. All arthropods are covered by a hard exoskeleton made of chitin. Today the phylum of arthropods is the largest; it has over a million modern species of arthropods.

An ovicid phytosanitary product is an active substance or a preparation capable of preventing the evolution of the eggs by killing the embryo. To protect the cultivations against the parasites, the knowledge of the ovicid characteristics of the phytopharmaceutic products applied and the knowledge of the date of the beginning of laying allow reasoning with the use of insecticides and mite-killers.

A larvicid phytosanitary product is an active substance or a preparation that is specifically targeted against the larval life stage of an insect. To protect the cultivations against the parasites, the knowledge of the larvicid characteristics of the phytopharmaceutic products applied and the knowledge of the date of the beginning of laying allow reasoning with the use of insecticides and mite-killers.

Allopathy: usual mode of medical treatment that fight the disease by using medicines which have an effect opposite to the pathological phenomena.

THE NEEM IN THE WORLD

The international network of the Neem was set in 1194. It centres its activities on exploring and evaluating the genetic diversity of the Neem[5]. Some national institutes in 23 countries in Asia, Africa, Latin America and Europe take part in the network activities. The general coordination is secured by the Department of the Forests, the FAO (Food and Agriculture Organization of the United States[6]). The technical medium that is to say the engineers and the laboratories, is secured by the Danida Centre of the Forest Seeds (DFSC), now incorporated to the Forest and Landscape Denmark (Danish Centre independent of the Copenhagen University (UC) for the forest, landscapes and the planning).
An expert group of the FAO of the forest energy resources recognized the real value of the Neem and its potential. He cited it among the species which deserve the absolute priority for the tropical countries in the dry area.
Thanks to its good adaptation to the hot and dry climate, this tree became one of the most commonly planted species in the dry and semi-dry areas. We find the Neem tree in its native country (India) but also in Africa, Latin America and in the Caribbean Islands.

In the African Sahel, the Neem is planted mostly as a shade and windbreak tree. It is also used in the production of firewood and in the manufacturing of local medicines.
In India, the neem extracts are usually used as a medicine but also as a pesticide/insecticide.

Several public organizations, private associations, ONG and individuals support the development of the research on the neem and its cultivation. Numerous works are in progress about the use of the neem's natural extracts and chemical substances for industrial uses. We study their pesticidal properties in order to encourage its use by the farmers and the rural areas of the developing country.

It is important to highlight that, besides its pesticidal properties, the neem is polyvalent specie used just as well for the conservation and the doing up of the environment and the improvement of the soils, that as charm[7] and shade tree.

To promote the Neem, an independent and non-profit-marking **organization** was set in 1953.
Its objectives:

- To work to bring back the natural preparations
- To develop the research in order to understand better and use the natural preparations
- To protect the environment, especially by reforestation actions.
- To fight the bio-piracy[8].

USES AND ACCOUNTS THROUGHOUT THE WORLD.

In Brazil, all the fruit and vegetable producers but also all the distributors of farm products know the neem.
Since 2001, we use it frequently to cure the animals and for the agriculture.

Some examples of its action in Brazil in different sectors:

- Agriculture: caterpillars (all of them), mealy bugs, white fly, thrips, greenflies, *vaquinha* (variety of beetles) and beetles, fruit flies, *cicadellidae* (cicadelle), tomato cutworms (*Tota absoluta*), cutworms of the coffee tree (*Perileucoptera coffeella*), citrus fruit cutworms (*Phyllocnistis citrella stainton*) and other cutworms…millipede, earwigs…

[5] http://www.fao.org/newsroom/
[6] http://www.fao.org/forestry/site/neem/
[7] http://www.fao.org/DOCREP/MEETING/007/AC495E/AC495E01.htm.
[8] The bio-piracy is the fact of taking for ourselves the biological resources of a country or a population for commercial purposes. It is mostly put into practice by the Northern countries to the detriment of the Southern countries by means of patent registrations on genes or species which guarantee to their holder the exclusivity of profits linked to the marketing of the products which are diverted from it.
http://www.ulb.ac.be/inforsciences/actusciences/dossiers/biopiraterie/marqousier.html
http://www.ulb.ac.be/inforsciences/actusciences/dossiers/biopiraterie/vandana.html

Meloydogine, Pratylenchus and other nematodes. Diseases of the radicular system and of the plant stem, powdery mildew of the beans, *Rhizoctonia solani* (rhizoctone brun), *R.Oryzae, Sclerotium Rolfsii, Scletorinia sclerotiorum, Sitroga Cerearella, Fusarium oxyporum, phitophtora* (tomatoes and potatoes).

- In the rearing: ticks, louses, fleas, horn flies, cowsheds and pigsty flies, scab, mites, beetles of the farms…
- In the grains storage: termites and weevils.

Source: *Agromix Brazil*.

The "Old country", south of the Elbe, near Hamburg in Germany, is one of the biggest arboricultural areas in Europe. In Jork, on their 40 ha of apple orchards, the Zum Felde family gave up the traditional methods of agriculture in 1996. "Even if we produce in biological agriculture, we do not renounce to the phytosanitary protection", said Heinrich Zun Felde. Among the products he uses, we have to pay attention to one of them. "I have been using azadirachtin for 7 years and thanks to it, I was able to contain the invasions of the *dysaphis plantaginea* (Lausbefall), answered the arboriculturist, very happily. A solution coming from Asia: "the azadirachtin prevents the production of a hormone allowing the moulting of insects. The active principle is extracted from the neem's seeds, a tree whose properties are used in India since more than two thousand years, in agriculture and in medicine".
Source: "The Furrow", summer 2007.

In silviculture, the neem is also well known in Canada. The potential of the neem was evaluated in the plantations of grey pine trees, on white pine trees, in plantations of pine trees, in seed orchards and plantations of dark and white spruces, plantations of occidental thuja (Ontario) and in planting of Balsam Firs in Terra-Nova.
Result: The azadirachtin extract contained in the neem'seeds was very efficient against the larva that were destroying the foliages, against 13 species of lepidopterous insects and against sawflies.

More information
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"Spruce" is the name of the Canadian spruce (épicéa).

Something that destroys the leaves of a tree (défiolatrices).

Insect of which the adult, who has a proboscis to suck the liquid aliments and 4 wings covered with microscopic scales, is a butterfly and the motionless nymph is a chrysalis. (The lepidopterous insects form a great group, more than 100 000 species).

THE NEELM OIL

The product:

The quality of the neem oil changes according to the manufacturing methods.
The kernel extracted from the seed is transformed into oil:

- Either by a hot process that gives bigger quantities but the insecticide content (azadirachtin) is sonly 300 ppm (by million)
- Or by a cold process that allows reaching an insecticidal rate (azadiracthin) superior of 1600 ppm.

The natural preparation neem oil is elaborated from cold dried, ground and squeezed fruits. Its efficiency was validated by a Laboratory "Vegetable Biotechnology" specialized in bio-stimulating. The tests in fertilization and protection of the cultivations showed an evident efficiency of neem oil. They are also a real natural alternative to the pesticides and to the chemical fertilizers.

Directions of use:

The neem oil dilute in water (2% emulsion with soap nut powder or liquid black soap)

For the vegetal treatment:

Put the mixture in a vaporizer and spray one per week or every fortnight on the sick plants.

Tricks:
The solution, obtained thanks to the mixture, is oily and naturally sticks to the vegetable leaving a thin layer slightly greasy on the plant's surface. The elements contained in the Neem oil go in the leaves through tiny openings called stomata. We mostly find them in greater number on the inferior face of the leaves. It is important to take it into account during the vaporization below the leaves. The foliage fertilizer is better swallowed if it is sprayed early in the morning or in the evening because the air is fresher and the ambient humidity is higher. This favours the openings of the stomata.

To move away the snails and the slugs.

Spray the solution on a dry soil. Don not water immediately after.

For the animal treatment:

Against the flies and the insects:
Spray on the ground and on the walls of the stables, preferably twice a day when the animal is out. It is not recommended to leave drinks and foods out during the treatment because it could have a bitter taste.

Flies and ticks repellent:
Correct proportioning: 5 to 10cl with water, almond oil or a sweet-smelling lotion. Apply or spray the mixture directly on the skin.

Ticks and fleas repellent:
Correct proportioning: use the pure product.
Apply directly the oil on the horse, leave it for an hour in the sun or outside and rinse it with some shampoo.

For the hoof.

Correct proportioning: 5cl to 1 litre of water.
Soak the hook in the mixture.
This treatment is applicable to the cows, sheep, and pigs as well as on the pets.

The neem oil may be used pure for the treatment of sheep, cats and dogs for instance. In this case, leave it for half an hour and then, rinse it with shampooing.

Neem fruit pellets

The Neem (Azadirachta Indica) is a tropical tree, Mahogany's cousin, known and venerated since the midsts of time in the Indies (it is called the "pharmacy of the village")
The Neem gives a little yellow fruit that is edible. It looks like an apricot and also has a seed with a kernel inside of it. This fruit is harvested at the monsoon and is dried up in the sun (pulp= about 10%).
The processus of fabrication is very simple: after it has been dried in the sun, the fruits are subjected to a double grinding through a “rotary crusher” and a “pulveriser” (disc harrow). The obtained powder is sifted. For a commercial use, the powder will be compacted into pellets, more easy to be used with a sower. These little grains are then bagged.
The Neem fruit is the ideal fertilizer for the organic culture.

Below, an article published in the "EUROPA AGRICOLA" magazine of February 2004 that mentions studies made by the Dr Vicente Marco (Laboratory of Vegetal Health) worried by the problem of the LOBESIA BOTRANA in the vineyards of the RIOJA wine area. The best results were obtained with the azadirachtin, that is to say the Neem. In burgundy, wine growers already use it for the disinfection of grounds and against the flavescence.