Elaeis guineensis (Jacq.)

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Grade 11 Agriculture Science Monograph
Submitted:
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Introduction:

In the text below I will explain and detail the main characteristics of *Elaeis guineensis*, better known as the oil palm: a plant whose economic importance is increasing throughout the world due to the countless uses found in its fruits, and the millions of people that depend economically of this palm. This palm is native from the guinean cost located in west africa, and was first exported by egyptians and later by spaniards and portuguese that takes it to the 'new world'.

The first chapter, chapter two will discuss the Ecology of the plant in which I will discuss about its origin, Afinitties and its present distribution.

The third chapter, about the biology of the plant will discuss essential aspects like Sexuality, ecophysiology, and life cycle of the Elaeis guineensis.

The fourth chapter will discuss how the plant is propagated and managed through pest diseases and control, chemical application of fertilizers and nursery ad vegetative propagation.

The final chapter will set out the economic importance of the plant with its uses and markets.

Chapter 2: Ecology

2.1 Affinities:

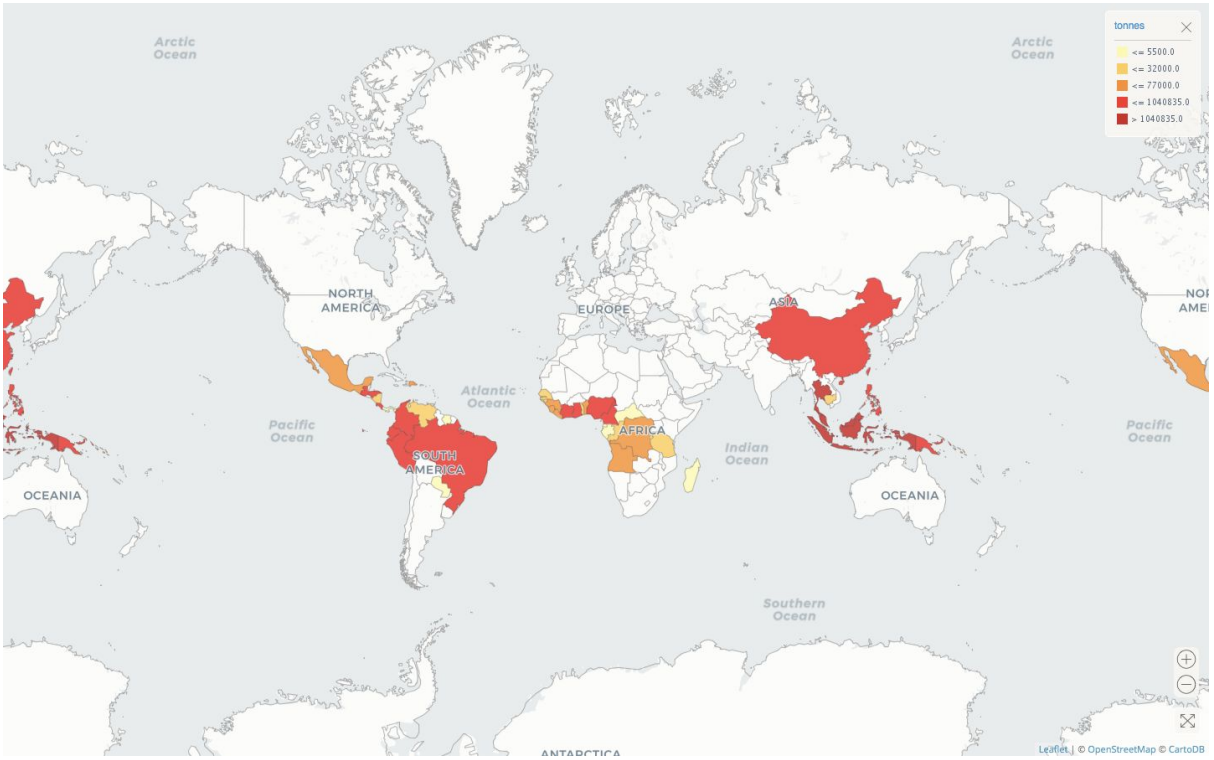
Elaeis guineensis is part of the Palmae family, It is also part of the Monocot Group which is under the order Spadici Flora and later included in the Cocoineae tribe.

Kingdom: Plantae
Tribe: Cocoineae
Order: Spadici Florae
Group: Monocot
Family: Arecaceae
Genus: *Elaeis*
Species: *guineensis*
Common name: African Palm

This oil palm makes part of family Palmae which has over 2,500 species that live in the equatorian or sub equatorial zone, with only a primary trunk which contains all the leaves and fruits at the top of the plant.(Ortiz and Herrera, 1994).

2.2 Origin:

The Elaeis Guineensis best known as African palm. The word *Elaeis* is originated from the old greek which means oil. This palm is native of Guinea coast , Africa, which is why the species name is guineensis, this name was given by Nikolaus Joseph Von Jacquin in 1763, how was the first person to describe this spicie (Ortiz and Herrera, 1994). Nowadays it is found almost in all tropical countries.



(Figure 1,FAO)

This map shows the plantation distribution of palm oil around the world in 2013, according to the FAO Organization.

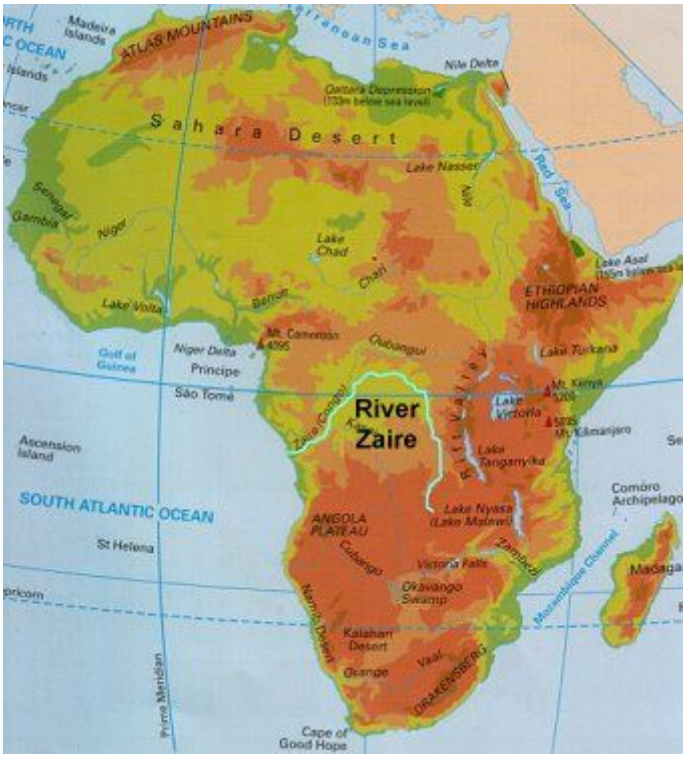
A massive propagation of the palm in the early XVII century lead some scientists from the mid XVIII century to state that the Oil Palm was originally from the Brazilian coast, until new evidence lead them to prove that theory wrong and to finally state that it is original from Guinea.

This distribution was made possible by Portuguese explorers since 1605, which gave the African slaves a type of flour made by an unknown root, and the fruits of the african Palm to eat throughout the journey. Once the boat stopped into a port, the remaining fruits were thrown away and the palms rapidly grew. (Hartley, 1988)

It has been used over centuries in order to obtain oil from its fruits, at the end of the XIX century it was discovered a bowl fill with oil (from the African palm) on the tomb of the pharaoh Abydos, which was estimated to have lived 3,000 years ago. It is long debated who brought the oil palm to egypt, some say were the arabs, but they did not existed on africa until VIII b.c, some others say they were the same egyptians that found that palm in the middle of explorations, but there's not proof of this, what we certainly know is that the Coroto Palm (oil palm) has been used over centuries by humans, but is only now when the "civilized man" discovered it and all its properties.

2.3 Fossil Records:

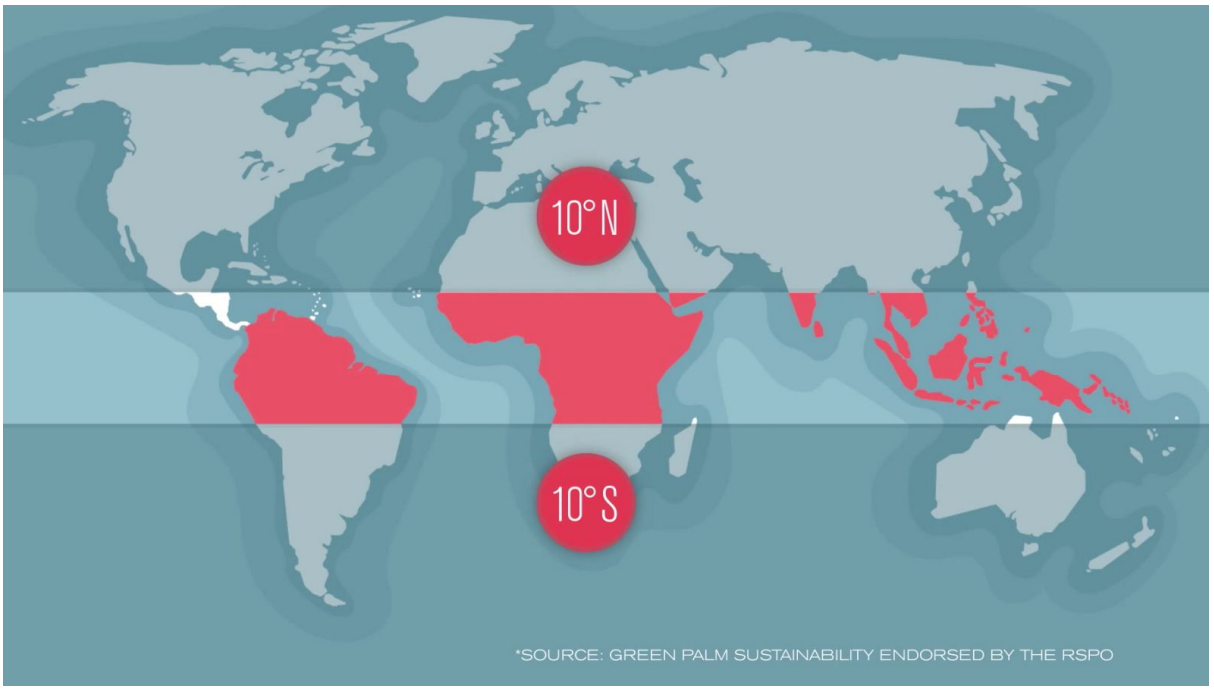
Fossil records of this plant are limited, but data suggests that the first palms dates from the Cretaceous period, and it has been used by humans for more than 3,000 years. (Ortiz and Herrera, 1994). Although the last study made in 1997 by "Centre d'Informatique Appliquée au Développement et à l'Agriculture Tropicale, Musée Royal de l'Afrique Centrale " (In english, Center for Applied Informatics for Development and Tropical Agriculture, Royal Museum of Central Africa), discovered evidence that the Elaeis guineensis appeared almost 3 million years ago on the beginning of the Zaire river, and fall into the atlantic ocean near the guinea coast, this have lead scientist to speculate that probably the fruits of the plan were moved into the guinea coast by the flow of the river, but this speculation is not definitive and more research must be done in this topic (Ergo, A.B. 1997)



(Figure 2,)

This map shows the path of the river that supposedly had transported the fruits from somewhere near Uganda to the guinea coast.

2.4 Present Distribution:



(Figure 3,)

This is a map that shows the area where the african palm it's commonly found, this territory goes from 10 degrees north in latitude to 10 degrees south in latitude in respect to the equator. Although there's still major plantations of the Oil Palm outside of this areas, for example the plantations in china, but the average production of oil per closter, is much lower compared to countries like Malaysia and Colombia that are inside this belt, as we can see in the maps below:

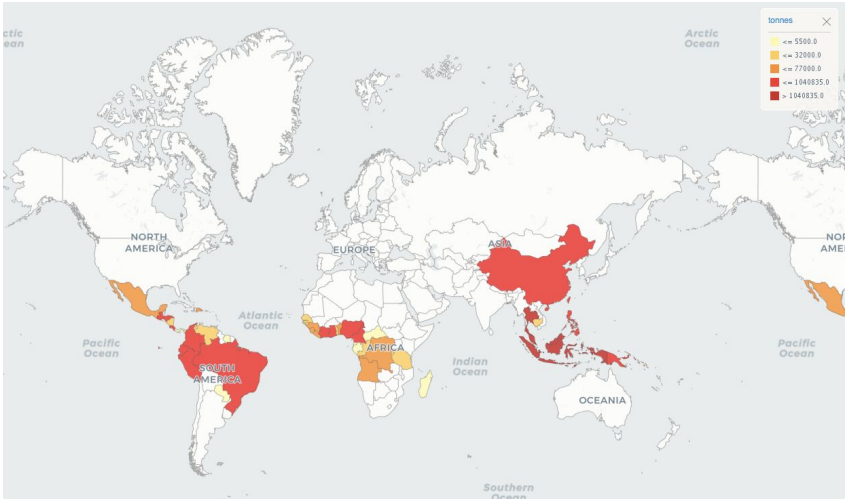


Figure 4 This map shows the percent distribution in 2014 according to the FAO organization of the plantations of Elaeis guineensis per country.

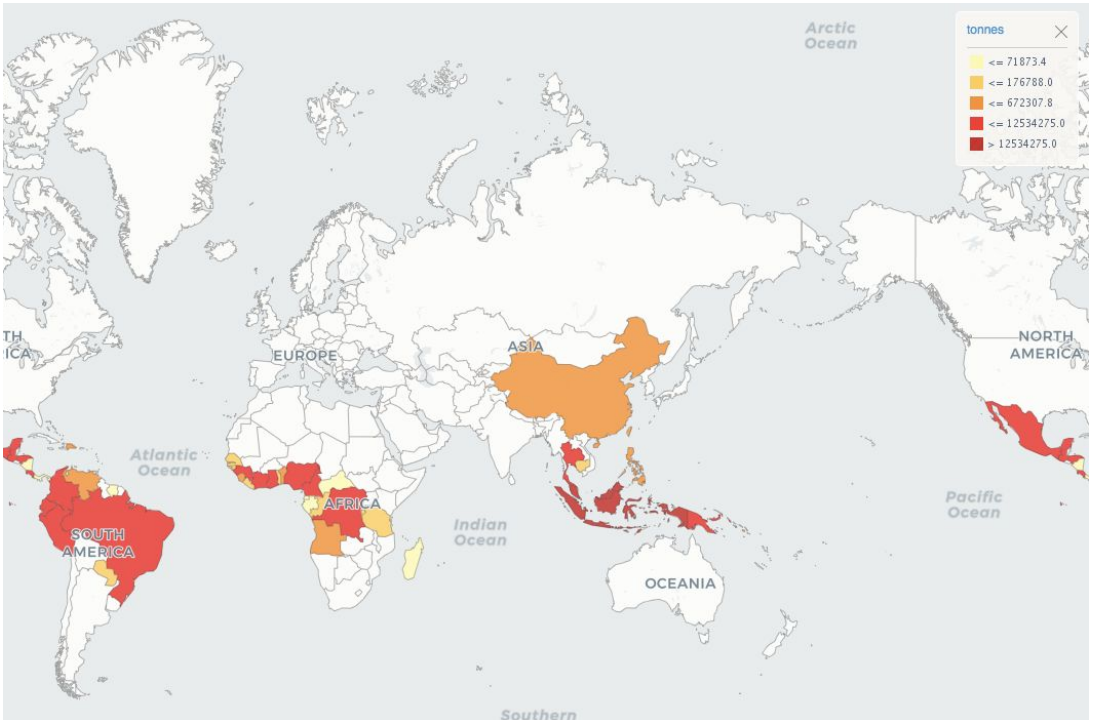


Figure 5.

This map shows the world's production of oil palm fruits per country in tonnes, by seeing both maps we can detect that although china appears to have huge amounts of palms planted the total production of the fruit is very low. This tells us that the performance of the palm increases when the palm is closer to the "Oil Ring"(when the plantation is between 10 degrees north and south of the equatorial line), (Corley & Tinker, 2003).

This type of tree is mostly found near lakes, rivers and in the coastal line of equatorial countries in nature, primarily do to the huge amounts of water needed to survive. But humans are starting planting this palm almost anywhere

In 1848 the fruits first arrived to asia, and their helpfulness were rapidly discovered, leading to an expansion of the oil palm production. In 1932 the palm was first introduced into colombia, but as a ornament and it wasn't until 1945 when the united fruit company started to plant the palm, after couple of years colombia would became one of the major producers of this oil in the world (Fedepalma 2010).

2.5 Environmental factors in distribution :

a) Elevation:

This plant is found almost always near sea level through 500 meters over sea level in nature, although this type of palm have lived until 1900 meters over sea level but on plantations were all factors are taken into account, but the maximum elevation also depends on other factors as the amount of rain, temperature, nutrients and light (PARAMANANTHAN, 2003). For example there's roughly 40,000 hectares of oil palm planted in the Colombian State of Santander, which its average altitude is 1230 meters over sea level.

b) Climate:

The Oil Palm can resist high temperatures as much as 33 degrees celsius, and a minimum of 18 degrees celsius, but the ideal temperature for this plant to flourish and grow is between 22-24 degrees celsius. (Hartley, 1988)

c) Luminosity:

This palm also needs at least 5 hours of light in every single month of the year, the solar radiation must be between 350 and 360 cal per day, for an average of 1500 hours of sunlight well distributed among the year. But all this numbers may change depending on other factors as the precipitation amount, as the more precipitation there is, the more light and the more solar radiation it needs in order to maintain the plant in a good shape. If this is not follow then the plant will slowly start to die, first its production lowers, later his stem shrinks and finally the leaves tend to stretch or Etiolation.(Surre & Ziller. 1963)

Figure 6. In the image above we can see a palm plantation in which the solar radiation and the amount of light were high, but the amount of water that received was significantly lower than needed, thanks to this the palm is slowly dying.

d) Geology and Soil:

The best type of soil for this plant is the Loam soil, which is the perfect composition between types of soil (which help contain the water for a short period of time ,but it permits the water to run off, in order not to saturate the ground with water rotting the roots). It is also important to highlight the importance of the run of water, as if the plant is always saturated with water, then the plant's roots will not have the opportunity to breath killing the cells and finally killing the roots. When this poor sewer system takes place the palm starts to create more superficial roots which eliminates a great portion of the microbial activity which limits the absorption of fertilizers and makes it harder for the flow of CO_2 and other important substances.

Also the appropriate type of soil should count with lots of nutrients such as magnesium, potassium, calcium or phosphorus. By ensuring that the palm gets all the minerals it needs, it will make that the palm grows as fast as possible, and that the fruits would grow as much as they can. (Ortiz and Herrera, 1994)

Another factor to take in consideration is the importance of the soils pH, that if it's not between 5,5-7 then it means that the soil is acid which means there's a lack of nutrients received by the plant and it wont developed and grow as good as it is supposed to.

Figure 7.

If costly technology is not available in order to know the components of the soil, then the way to know if the soil is in good shape is by taking some soil, and looking for the following; the color, this should be as dark as possible, this tells us that it has many nutrients. Another characteristic is to find organic matter, this is little pieces of roots, and animal excrement.

The table below (Table 1) shows the limitations and the implications of certain types of terrine have for oil palm.(Borrero, N.D)

Table 1: Limitations of soil type on the growth of oil palm. (Adapted from Borrero, N.D.)

Limitations	Implications
Superficial ground	Little reserve of nutrients. Little volume of roots. Higher cost of preparation and fertilization.
Sandy ground	Little reserve of nutrients. Greater frequency of fertilization. Little water retention
Very clayey soil	Higher drainage costs. Higher tillage costs. Disease risks
Low nutrient content	Higher fertilization costs.
High slope	Higher planting costs. Higher harvest costs. Greater cost of general maintenance.
Water deficit	Higher costs for irrigation.
Excess of precipitation	Higher drainage costs. Limitations for fertilization. Limitations for field operations. Risk of diseases. Low radiation

Precipitation:

The oil palm, is characterized by requiring a lot of water to live. in average the palm needs between 1500 mm - 2500 mm of water per year, although it is recommended to have the precipitation levels over 2000 mm, to ensure the correct growth of the palm. This precipitation levels must be well balanced through the year, to prevent a drought or an excessive amount of water that could kill or severely damage the palm's growth or production. Obviously all these quantities of water also depend on the type of soil it has. Primarily on the characteristic of water retention, if the soil is majority made by sand and lacks organic components, it will obviously drys really fast, then the palm would require a lot more water than what is needed by a palm that is planted on a loam soil, which counts with all the necessary components to make the palm grow as fast and strong as possible (Ortiz and Herrera, 1994). Another factor to take into account in respect to the amount of water needed is the temperature the area has. if it's too hot it will dry faster than if its colder.

2.6 Diseases

This plant has numerous diseases some transported and transmitted by animals and others through the root system.

Red Ring - little leaf:

It is one of the most common disease, its name derived by the red ring that is found at the interior of the palms trunk, or the fact that when the palm is sick its leaf becomes smaller and darker. this type of disease is transmitted by a little insect called Red weevil found on central and south america, especially in Colombia, Brazil, Ecuador and Venezuela. When the symptoms are late detected the palm dies and it's very probable that the surrounding plants are also infected as the little insect may have already jump several times from palm to palm.

(Figure 8,)

Túnel Worm:

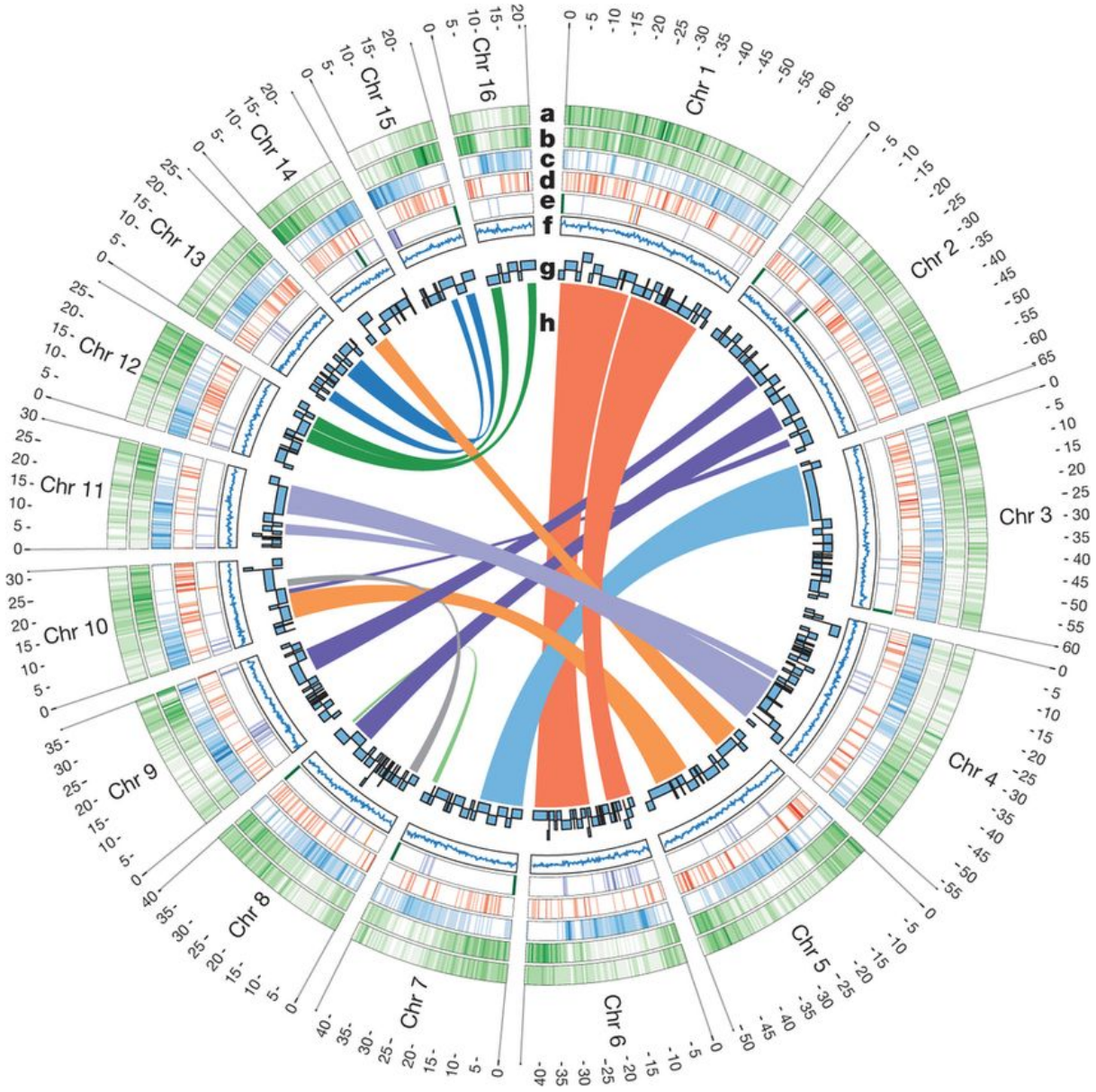
This is a type of plague that is based on little worms that measure 23-30mm. this larv starts by eating the old leaves which are usually at the bottom of the plants and as more worms come to eat, the higher the larv needs to go. Finally the plant will no longer have leaves and will die as it is through them that the plant absorb light in order to make photosynthesis.

(Figure 9,)

Chapter 3: BIOLOGY

3.1 Chromosome Complement

The Elaeis Guineensis counts with 16 pairs of chromosomes, while the native American palm counts with 18 pairs, resulting on a hybrid with 17 pairs of chromosomes leading to some major problems like the inability to reproduce from its own pollen.



(Figure 10,)

3.2 Life Cycle And Phenology

3.2.1 Life cycle

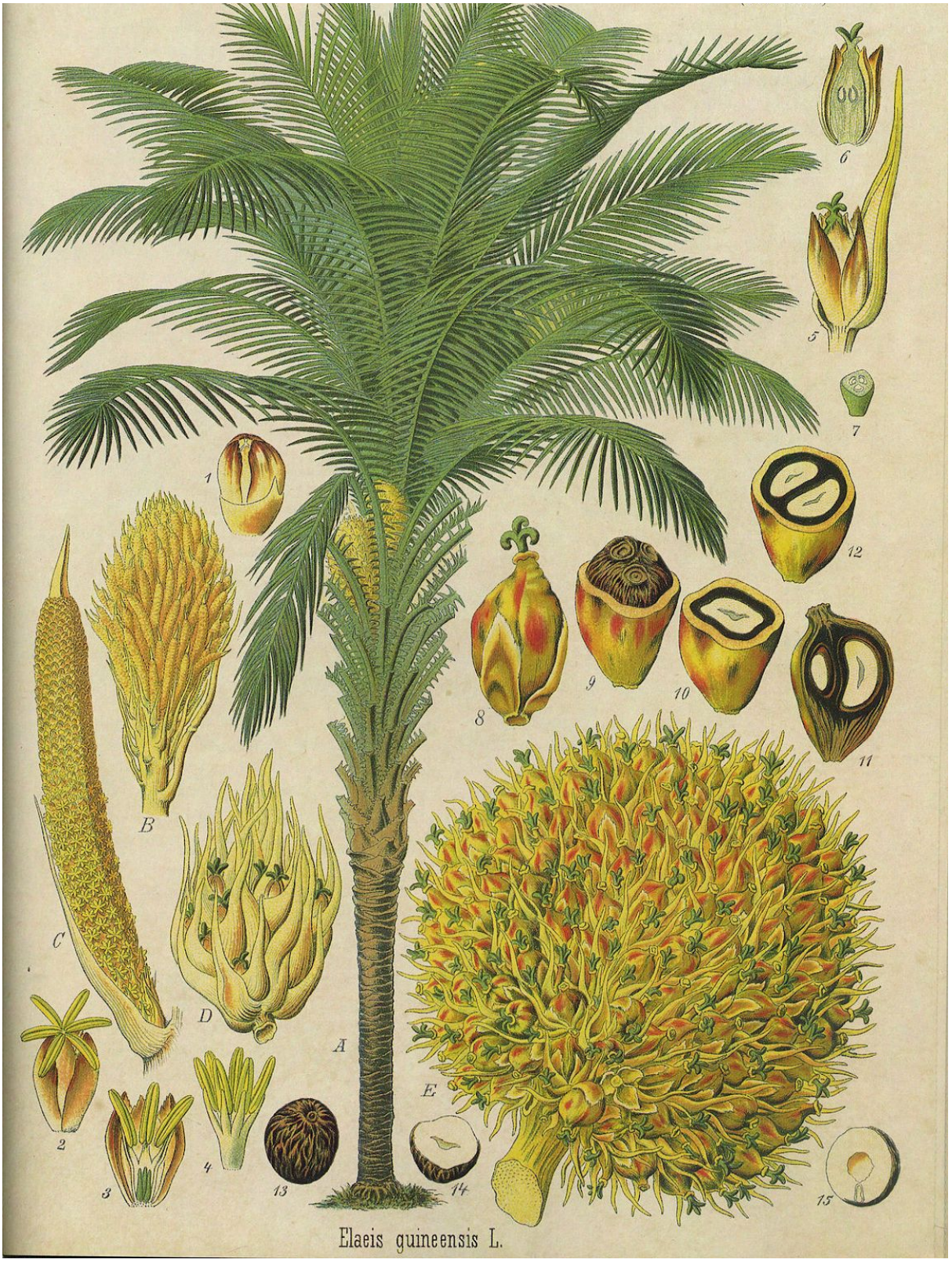
According to a investigation made by the Universidad Nacional de Colombia in collaboration with CeniPalma that was lead by Paola Hormaza, Eloina Mesa Fuquen and Hernán Mauricio Romero says that the oil palm starts its life as a seed and has a germination rate of a little more than 80%. The plants usually start in a nursery garden until they are 50 or 60 cm in height, which is 2-3 months and the plants are sufficiently strong to resist mild droughts and mild rainy seasons on the fields.

When the plant does not start its life in a nursery garden, it starts directly on the field, obviously this process provokes a lower rate of survival among the plants. The plants are planted in rows towards the north, this is done in order to optimize the light that every plant gets. In the majority of places the plants that have abnormal growth, or die in early stages, will pass through a process of overseeding. this process is that a new seed is planted were the original didn't survive. The overseeding process is mainly done on the rainy season, in order to boost its growth, but it can also be don on the dry season, the negative part is that there's a risk that animals may eat the seed.

After the plant has pass its critical period, the farm or the owners of the plant need to supply the plant with the nutrients that the soil lacks, this is done in order to obtain a better performance of the palm. Some of the nutrients and elements put on the fertilizer may be Nitrogen (N), Magnesium (Mg) or chlorine (Cl) but the quantity of them is determined by the soil type. This fertilization period is usually made when the palm is 6 months old, 1 year and 2 years, starting the 3 year the fertilization is made in base of the preclude analysis.

After 24 months or 2 years the palm will start producing clusters with fruits and as the time goes by the production of the palm will slowly increase, first it starts with 3-4 tons of fruits per harvest per palm and it will finally produce approximately 20 tons per harvest per plant . The palm will continue to produce clusters of fruits almost before its death, but really men can only gather the fruit until the palm is 20 years old, after this the palm is too tall and it preclude its harvest, and the amount of oil per fruit lowered dramatically after this time.

3.2.2 Phenology



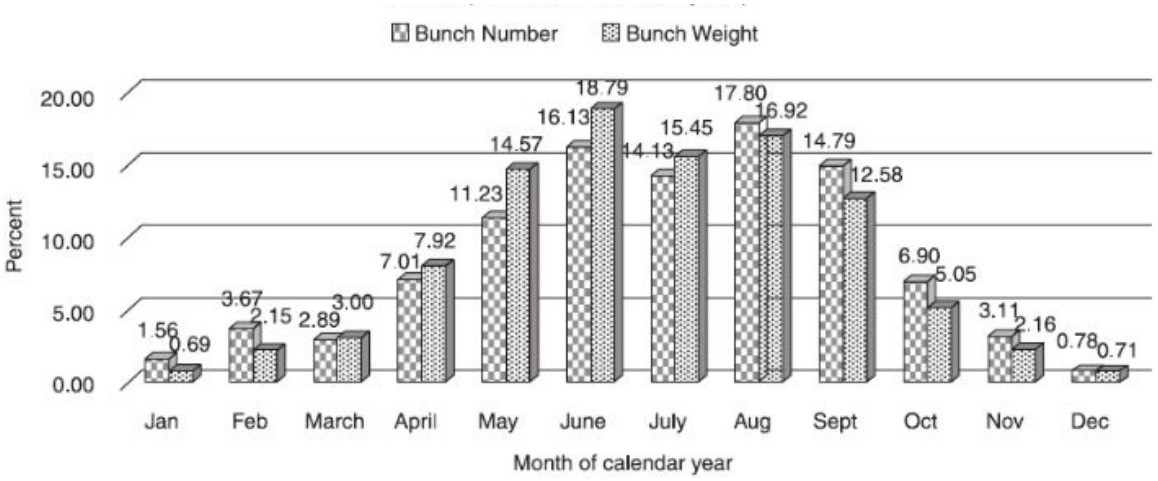
(Figure 11,)

This image show the main parts of the oil palm, from the trunk to the seeds.

3.2.3 Year-to-year variation in flowering and fruiting

According to a study made by the book "Relato sobre el híbrido interespecífico de palma de aceite OxG-Coari x La me: esperanza para el trópico" the oil palm has about the same quantity of female and male clusters on the ideal circumstances, when this conditions are not reached, the plant sufferers stress due to a drought or an excess of water. This negative conditions provoke that the plant replace the female clustered to male ones with the intention to reduce its energy consumption

Depending on the time of the year, the production of clusters and the weight of clusters vary significantly, as shown on the graph below, made by the Indian Journal of Agricultural Sciences and Association of Applied Biologists.



(Figure 12,)

This graph show the percentage bunch numbers and the bunch weights of a plant, compared with the yearly production of the palm.

This differences in bunch number and weight are not determined by the amount of sunlight, simply because the oil palm plantations are all in or in a parallel close to the equator, this proximity to earth's middle parallel makes that the amount of sunlight throughout the year be the same.

3.3 Reproductive Biology

(Figure 13,)

3.3.1 Pollen

The pollen between palm species vary significantly, for the elaeis guineensis, the shape of pollen is triangular, while for palms native of north and south america the shape of this is similar to a square. When talking about hybrid palms the pollen lose a predetermined structure, and the shape of it becomes unique. This uniqueness of the shape makes it impossible for the female flowers to get fertilized, and pollen from the *Elaeis guineensis* palm is needed to fertilize the hybrid.

For pollinating the hybrid palm, the *Elaeis guineensis* pollen is mixed with talcum powder in a proportion of 1:8 or 1:10 depending on the humidity of the ambient, in order to make the pollen not to perish as a product of the water and oxygen on the air.

3.3.2 Sexuality

Figure 14: One the picture above we can see at the left the male cluster and at the right the female cluster

Both male and female clusters appear on the palm but it is only through the female ones that the fruits appear. The ratio between the male and female clusters are typically 1:1 on perfect conditions, but when the palm suffer stress this ratio tend to increase towards the male.

3.3.3 Anthesis

The antithesis of the female flower is when the flower is completely functional and ready to receive the pollen and create the fruit. This is not a process done all at once and not made in couple of hours. Instead it happens in three phases, usually the hole process take one week.

This process starts from the bottom up, each phase consists of about the 33% of the cluster, the first part that is active is the bottom, couple of days later is the middle part becomes active and finally it is the top. This difference in anthesis makes it mandatory for the palm to be fertilized in different periods and a uneven pattern of
(Guerrero, 2002)

3.3.4 Pollination and potential pollinators

Pollination of this palm may happen in two different ways, the natural and the human made.

The natural way to pollinate the palm is through two ways through air and by insects which go to the male clusters, and eat the pollen and other little insects which cause their legs and body to get mess up with pollen that will later fell to the female flowers once they get there. This This poses colonization made by insects like the Elaeidobius kamerunicus and Elaeidobius subvittatus, this is performed usually between the 6 a.m. and 10 a.m. after this period the temperature gets to high and the activity of the insects decreases. When Referring to the police station through air it is important to Highlights that when it rains the percentage of pollen in the mele clusters lowers, reducing the probability that the female flowers get fertilized.

The other way to pollinate the female flowers is through the assisted pollination, This roses brings a germination rate between 60 to 90% And it is made by men in an artificial way. This consists on taking the pollen from the male clusters mixing it with talcum powder and Spraying it on the female flowers.It is mixed with this powder in order to maintain a relatively low humidity and prevent the pollen from rotting, the proportion between Pollen to talcum is from 1 to 20 or 1 to 8 depending on the humidity of the environment. This process needs to be repeated at least three times to get a better chance of germination, This is because the antithesis of the Palm does not happen at the same time.

3.3.5 Fruit development and Seed set

(Figure 15,)

On the picture above, it is a clear example of the palms fruit on the moment it is ready to start the germination process.

(Figure 16)

On the picture above we can see the early stages of the Oil palm. On this stage the seeds would be being planted on the nursery garden.

Throughout history the use of heat for the germination of the seed has become evident (Bucher and fickendey, 1919). In the middle east, when the seeds were dried at the sun

and watered with abundant water, germination reaches a high percentage of success.In comparison this was not the case when the seeds arrived in West Africa, where it is a very humid climate and with little luminescence on the part of the sun, it caused that the ratio of germination will only reach 60%. Workers and experiments have shown that the perfect temperature to break the dormancy si between 39-40 degrees celsius or 102-104 degrees fahrenheit for 80 continuing days. (R.H.V. Corley, 2003)

Another important factor about the seed germination is that the longer the seeds are in the numb or in a dormant stage, the lower possibility that the seeds will germinate.

3.4 Ecophysiology

Ecophysiology is the study of the responses of the plant towards the environment, in this case, the Oil Palm when exposed to low temperatures enters a phase with a low vegetative growth, rapid bunch ripening and in the extreme cases it may lead to abortion of the clusters. When water is scarce photosynthesis lowers rate the same as the stomatas that are reduce size, disminuing transpiration (this same process happen through the day but in smaller quantities cause of the heat). (R.H.V. Corley, 2003).

Chapter 4; Propagation and Management

4.1 Chemical Application of fertilizers

Fertilizers are probably the easiest way to eliminate pests and other unwanted material, yet this is not only dangerous and the negative to the ecosystem but also to the plant, these fertilizes Start by killing positive bacteria the help the plant acquire valuable nutrients like nitrogen, and later it starts to attack the root of the plant, when is huge amounts of fertilizers are put, the majority of roots will die making the palm not acquire Essential Elements for survival and finally die.

4.2 Nursery Propagation

The nursery propagation starts on a specialist Centre in which all the seeds pass through a dark room, temperature with temperatures Superior or equal to 39 degrees C, and the relative humidity of more than 75%. after the 48-hour stay, are then taken out and place on big beds in which each individual seed is examined by a professional, the ones who are strong enough are then taken to a Nursery spot and placed into little bags with no size determined and placed 1 centimeter below the surface. When the plant has at least four leaves are then taken out of the bag and placed on Leon bigger bags with a measurement of 56 centimeters of longitude and at least Thirty centimeters of diameter, and we'll wait there until they are one year old when they are little please on the fields.

4.2.2 Vegetative Propagation

When each seed has already passed the face of maturity, fell down the palm into the ground which then roll away with the help of air until an obstacle is found. Then the seed will wait there until the perfect conditions of temperature humidity and water are established, The seed will grow and the new palm will be formed.

4.3 Planting

According to Greenpeace they have been more than 130,000 forest fires just in Indonesia making it appear in the Guinness World Records for being the world champion in deforestation and its main cause Is to plant oil palms, this deforestation Is being sponsored by Multinational companies. All of this is not only destroying the habitat of thousands of animals but also aggravated the climate change, by polluting the environment and destroying the trees and that Helped purify the air.

The Existence of Herbaceous plants near by the palm plantations would maybe provoke a dangerous habitat for the germination of the seeds or the survival of young palms this is because species belonging to this family like grass or other type of herb are characterized by their rapid growth, this growth is not upwards the sun like most plants, instead it grows horizontally suffocating the new palms and not letting them collect nearby nutrients nor sunlight. that's why before planting and in the first phases of the palms growth, farmers spray the surrounding area with insecticides and herbicides, unfortunately this products are harmful to the environment and may harm the palm. (Philippe Genty & Magarita R. Ujueta Lopez, 2013)

The first step of planting the palm, is not usually on the campus it will leave and stay for the rest of their time, Instead it is first taken into little gardens called nursery gardens where the process of germination starts this usually starts by cleaning the seeds and later heating them to end dormancy. after this each seed and each palm receives a specialized attention, in order to guarantee in survival. after this phase the little plants will go to small bags where they will grow until they can leave by their own. After this period of delicacy has ended the Palms will go to the fields. At the moment to plant the palms into the fields is needed to make a hole almost of 1 Meter by 1 Meter for each palm at the center of it, then the soil will be mixed by fertilizers in order to guarantee that the Palm will have sufficient nutrients and will be capable of surviving by its own the natural dangers. If the palm is big enough it is may be needed to attach some strings around the trunk in order for the palm not to fall to the ground. (Philippe Genty & Magarita R. Ujueta Lopez, 2013)

4.4 Management

Maintenance of young and mature plants are different, First of all after the Paul has been planted and have lived on the field for 2 months, it is needed for the farmer to enter the field and examine which palms have survived and which have not. For the ones that have not survived it is needed to make an overseeding. (R.H.V. Corley, 2003)

Depending on the farmer and the conditions of the terrine and the soil in which the palms have been planted, changes the rate at which fertilization is needed, In order to determine the lack of one nutrient or one element on the palm it is needed for a full analysis which determines what are the aspects the palm is requiring. If this analysis is not possible, there's also some visual symptoms that could help the farmer to determine which are the nutrients are lacking on the Palms lacks. For example, when nitrogen is needed it is evident by a change in the coloration of the

Leaves to transform into a more pale color, When's the lack is of magnesium it is evident that the leaves turn into a yellowish color, with the chlorosis decreasing towards the top of the palm and in the extreme cases the oldest leaves will die. (R.H.V. Corley, 2003)

4.4.1 Trending

Climate change and the constant hate towards any product made from non-renewable resources like petroleum have created a huge demand on Oleochemicals, Which are a type of chemicals made from natural oils like vegetable or animal oils and fats. This chemicals have been used in the rapidly increasing cosmetic industry and the Industries related to improve the physical aspect of a person or even on the food industry.

In the Cosmetic industry the importance of vitamin A and E is crucial and It is easy to find on natural oils like the Elaeis guineensis oil. This two types of vitamins are important especially for the skin, that's why the main products made from the palms oil are soaps, makeup in order to create volume or moisturizers for the skin.

On the food industry the globalization has provoked world class chefs to try different foods from all over the world and create new plates based on food or ingredients from other parts of the globe. One of these new ingredients is the oil from the Elaeis guineensis Palm which were used in a lot of African cultures to add flavor into their food, plus this oil is more healthy than other types of oil used on the chichen.

4.4.2 Pest Disease and control

In the last couple of centuries the primary ways to kill and to eliminate pests is by applying pesticides, That could be distributed by aerial or terrestrial spraying, Which were applied following the cycle of the animal in order to improve its efficiency. Pesticides and the chemicals in them are not directed only to only one specie we want to eliminate or reduce, but it is also killing species that help fertilize and help the environment. to resolve this problem numerous strategies have been implemented some of the most powerful ones are by bringing insects or another type of animal that is a natural predator to the negative specie this is caled entomophagous, in order to control which species we need and which species we don't. another way to reduce pests is by destructing the homogenization of the habitat and plant nectariferous plants that are famous for producing high amounts of nectar that brings a lot of wildlife in which Little insects come by which helps mantine a normal and natural level of the pest. (Philippe Genty & Magarita R. Ujueta Lopez, 2013)

Chapter 5; Markets and Uses

5.1 Markets

The oil palm Market Was estimated 57.56 billion US dollars in 2014 according to Grandview research. This Market has exponentially grown in the last couple of years one of the major causes is it several government specially on the North hemisphere have you made a law that obligates the mixing of the conventional fuel with the bio-based. this bio-based fuel biodiesel

5.2 Uses

These Palm counts with a lot of different uses, from cosmetics to food, this is thanks to the nutrients and proteins that make up this oil.

5.2.1 Edible Uses

Almost 90% of the world's palm oil is used for edible purposes, one of the most Commons is ice cream or ice cream topping, Specially and more notorious on chocolate flavors. Another very common use is on the whipped cream or some type of milk. It can also be found on fryers as this type of oil is extremely Resistant thanks to its high content of saturated and monounsaturated fats, this makes the process a fraying Take longer but it's also permits the food to cook in high temperatures which slows down the process of degradation. Although this uses have an important percentage on the usage of palm oil, the leading product would be margarine, This product was first made from an extract of milk and on the modern days it is mainly made from vegetable oil and water, making the product change its name in some parts of the world for example in the United States or in Great Britain that they are called it oleomargarine or simply Oleo. All of this makes that 30% of all the world fats and oils come from the oil palm.

5.2.2 Medical Uses

Still there needs to be more research towards the possible medical uses of the palm, Nevertheless since the 19th century people started to believe on the possible benefits of this plant to the point that's some started saying the oil could cure cancer and malaria. nowadays it's proven that this is not true, but it is also proven are there advantages that we're not thought on that time. One of the medical uses is as a natural anti-inflammatory, as described in the review by: Bamidele Victor Owoyele1 and , Gbenga Opeyemi Owolabi called "june 6, 2019 ". Another use described on this review what's its ability of being a natural antioxidant remedy. or even it was proven its ability to conserve and Preserve food or other things.

5.2.3 Use in textiles

The use of of the pump oil is relatively new, Jiratumnukul and Antarasane (2009) from the Faculty of Science, Chulalongkorn University found that applying oil to cloth will improve its water repellency. There are no other uses for palm oil in the textile industry.

Importance:

The oil palm is one of the most important plants on Earth, it is not only important for the thousands of animals that feed from the products of the palm (like the pollen or the fruits), But it is also important for the environment and most importantly it is important because of what the palm gives to the human species.

Conclusion:

In conclusion we can see that this is an extremely common crop on the world. This is also an extremely lucrative and with an extremely high importance worldwide not only because the millions of people that live thanks to this palm but the because of the high quantity of uses we have given to this plant, from food to cosmetics or even cleaning products.

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