



Meteorologists in the World fear 17 tropical storms thru Caribbean towards north this year. The experts fear a new "Katrina" hurdle. Due to higher ocean temperatures, the Central- and North America must prepare for far more hurricanes than usual in 2017.

The US National Maritime and Atmosphere Agency, NOAA, reports 13 to 17 tropical storms in 2007, writes NTB. "Seven to ten of the storms can evolve into hurricanes, three to five of them might develop to category three or higher, with wind speed exceeding 177 kilometers per hour," reports NOAA in its annual hurricane warning.

-Active hurricane season

While 2006 was a relatively quiet hurricane year, there was in 2005 as much as 15 hurricanes that passed the Caribbean and Central America before it reached the United States. Among them was Hurricane Katrina, who ravaged New Orleans in August 2005. The hurricane cost 1,300 people lives and caused material damage to \$ 80 billion. Now the US meteorologists fear a new "Katrina". "We are in a period of more active hurricanes. Only one bigger hurricane is needed to make this a bad year for everyone here (United States), says NOAA chief Conrad Lautenbacher to Reuters news agency.

According NOAA, an average Atlantic hurricane season causes 11 tropical storms, six of which develop into hurricanes. Also, meteorologist William Gray at Colorado State University fears extra many hurricanes this year. He reports 17 storms, and he believes that nine of them will develop into hurricanes. Tropical Storm Risk also reports an active hurricane season, writes the New York Times. This season's hurricane season has already started since before May. The tropical storm "Andrea" swept across Georgia and Florida in early May, and is the year's first named storm to hit the United States. It's over three weeks earlier than the normal start of the hurricane season, which usually begins June 1st and usually reaches the peak between the beginning of August and the end of October.



Tracks of North Atlantic tropical cyclones. A Hurricane is a storm that starts out as a Tropical Cyclone in the Atlantic Ocean or the northeastern Pacific Ocean and then grew in size and speed to become classified as a Hurricane;

Category 1: 119-153 kilometers per hour

Category 2: 154-177 kilometers per hour

Category 3: 178-209 kilometers per hour

Category 4: 210-249 kilometers per hour

Category 5: Over 248 kilometers per hour



-Nate

Nate started east of Panama and the coast of Costa Rica before touching Nicaragua and Honduras then made a land fall on the Mississippi coast.

Nate caused extremely heavy rains, landslides and floods, leaving bridges and roads impassable, destroying houses and farms. The Tropical Storm, which caused more than 22 deaths in Costa Rica, Nicaragua and Honduras, has also left at least 20 people missing. One of the hardest hit countries was Costa Rica where 400,000 people were left without electricity and transport connection for many days, some villages are still without access by bridges nor roads.

Nate caused some damage to our farms in terms of higher water level and heavy wind that jiggled the trees, these weather conditions would normally not affect the teak at all but because of the frailty state of the trees after last year (hurricane Otto), the trees did show some direct negative reaction and we fear that the affect forces us to harvest far earlier than we expected after Otto. The negative result on economic value will be far worse if we do not act by doing the harvest while the trees still has some remaining value.



"Life goes on, but it gets tougher every time we hear politicians and people in the streets say that "climate change is not man-made", Now it is time to wake up and do everything in our power to change the world if it's not too late already.."

-TEAK (*Tectona grandis*)

Native species in the rain forests of Burma, India, Laos, and Thailand, now grows in about 40 countries throughout the tropics. In Java, for instance, teak was planted generations ago, and the trees are managed for sustained yield.

If size alone didn't distinguish teak from other rainforest trees, its enormous leaves would. They can measure a whopping 60- 90cm, and their top surface is rough enough to sand with!

Naturally occurring teak grows to heights of 50m and diameters of 60cm (circumference 188,5) or more in about 150- 200 years. Plantation-grown teak (long term plantations) gets taller, but never as large in circumference, although it can be harvested in 60 years. Plantations of commercial growth (15- 20years term) grows till 18- 24m and a girth at breast height between 50- 70cm

Teak has a thin layer of yellow sapwood, but it's never seen by woodworkers. Importers and dealers instead favor boards of only coarse-textured, golden-brown heartwood. Teak, though, depending on its growing conditions, may have a greenish tint, small stripes of yellow and darker colors, or an occasional mottle figure. At about 40 pounds per cubic foot dry, teak weighs slightly less than oak.

Silica, which the growing tree extracts from the ground and distributes throughout the wood, gives teak an oily feeling and causes finishing problems. Freshly sawed boards also carry the aroma of old shoe leather.

Woodworkers with lots of experience working teak say that in old-growth trees from Thailand and Burma, the silica in the wood has broken down, making it easier to machine. However, younger, plantation-grown teak has practically the same performance qualities as old-growth, and you'll notice little difference in machining, although the color may vary, depending on the conditions at the location where it grew.

SECONDARY DAMAGE THAT A STORM OR A HURRICANE CAN CAUSE ON THE TEAK TREES



Examples of Heart Rot on teak caused by exposure to fungus that may occur when the roots have been "jiggled" and fungus-contaminated water enters the wounds and marrow of the tree, in this example the hole was continuing 6.8 m up the stem, a complete loss in value

-CAUSES OF HEART ROT IN TREES

Heart rot in living trees can be caused by many different fungal agents and pathogens that can enter the tree through open wounds on the bark or the roots and expose inner bark wood to infiltrate the center marrow of the tree and further soften the heartwood. Heartwood makes up most of a tree's inner wood and support structure, so over time, this rot can cause the tree to fail and collapse.

Heartwood cells have some resistance to decay but depend on a barrier of protection from the bark and outside living tissue on the roots. Heart rot can occur in many hardwoods and other deciduous species, but is especially common in teak and oaks infected with the *I. dryophilus* and *P. everhartii* decay fungi. All deciduous trees can get heart rot, while resinous conifers have some extra resistance.

-MORE ON HEARTWOOD

It should be noted that heartwood is genetically programmed to spontaneously separate from living wood tissues that surround it.

Once heartwood formation has begun to lay down annual layers and increase in volume, the heartwood quickly becomes the largest part of the tree's structure by volume. When that living barrier of protection surrounding the heartwood fails, the resulting disease in the heartwood causes it to soften.

It quickly becomes structurally weaker and prone to breakage. A mature tree that has a large volume of heartwood is more at risk than a young tree, simply because its heartwood constitutes more of its structure.

-SYMPTOMS OF HEART ROT

Usually, a "conk" or mushrooming fruiting body on the surface of the tree is the first sign at the site of

infection. A useful rule of thumb suggests that a cubic foot of inner heartwood wood has decayed for each conk produced— there is a lot of bad wood behind that mushroom, in other words. Fortunately, though, heart rot fungi do not invade living wood of healthy trees. Other than the resulting structural weakness heart rot creates, a tree can otherwise look quite healthy even though it is riddled with heart rot.

-ECONOMIC LOSS.

Heart rot is a major factor influencing the economics of logging high-value lumber, although it is a natural consequence in many forests. The heartwood of the tree is where the valuable lumber exists, and a badly rotten tree is of no value to the timber industry.

When suffer a major storm damage, at some point it will allow fungi to enter and begin the process of heart rot. In some cases, the entire forest might be at risk if a catastrophic storm has caused major damage at some time in the past.

Heart rot is prevalent throughout the world, and it affects all hardwood trees. It can be very hard to prevent and control, although a tree that is carefully monitored over its entire lifetime may avoid it if they have not suffered under major storms etc.



RGI SA and the summary of affects

Late 2016 and throughout 2017 has been a year of many difficulties for RGI and its farms, mainly caused by many incidents of storms but also by the confirmed negative market development that has been manifested throughout some years already. The market for teak is very narrowed and strongly controlled by the market of India, they are consumers of more than 95% of all the teak offered worldwide.



Storms, tropical storms and hurricanes, as I described earlier has become an almost weekly experience in recent times and it is not a pleasant one when you operate farms and plantations as we are doing. The constant disturbance on the root system of the trees, the abundance of water and the broken branches gives us an impossible task in trying to save the trees that have not already bowed under the hurricane Otto. Teak has from the nature a narrow root development, they grow naturally in bigger clusters protected

by the surrounding other species of trees and they are not capable of growing unprotected in their own small clusters. It becomes a domino effect when heavy storms and or hurricanes hit and hit the trees down with their roots up in scattered areas of the plantations, the trees that are still standing does not have any strength back when the next heavy wind hits them, not even for a small storm.



Some farms did have less direct loss from the hurricane Otto but beside the above mention factor there are other secondary effects that are prominently exposed, the *wood rot* as I wrote about earlier in this newsletter. El Parque is an example where this phenomenon has occurred, we have discovered, during these months after Otto, that many of the trees has already clear symptoms of wood rot, although in an early stage it is evident that they have been exposed by the spores of fungus (*I. dryophilus* and *P. everhartii*). The farms Carrizal, Combate and Gallito we cannot disturb yet by any thinning or even pruning, beside of that, these farms are still too young for any final harvest (little to noncommercial value) and we can only monitor them well until we know if they will recover or not. If they don't recover and or they develop wood rot, then they are almost considered to be a complete loss. By that meaning they are more expensive to harvest then the actual income from sales. We do our utmost to avoid that and that there will be at least some reduction to the investment loss.



We must admit that the economic side of our projects has been a disappointment when looking at the economic returns, but we have contributed well on the environment and the social aspects here in Costa Rica during these already 21 years that we have been here, *that* we are and should also *be* proud of.

I am also proud over the fact that RGI SA is one of, if not the only company in reforestation projects that are still here and will *be* here till the final tree has been cut and sold, although with far less outcome than expected, it will be paid out as returns to our clients.



Luckily, all the Costa Rican people have again opened their hart by helping those in worse conditions then themselves, that is the core of the people's personality in this country, that is "Pura Vida".

BJORN A JAKOBSEN