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Tree Seed

By Wayne Jones

A seed is an embryonic structure enclosed in a protective outer covering. Formation of the seed is part of the reproduction process in seed plants, the spermatophytes, which include the gymnosperms (conifers and cycads) and angiosperms (flowering plants). The embryo is developed from the zygote and the seed coat from the integuments of the ovule.

Development of reproductive structures in trees, in all their various forms, are highly dependent on species, site, tree height, diameter and climatic conditions. Successful formation of seed is only possible if effective pollination can be achieved. Pollination success and seed set depends on the mechanisms employed to transfer pollen from the anthers to the stigma and on species-dependent, self-incompatibility mechanisms. There are four main types of pollen transfer mechanisms, which include anemophily or wind pollination. Almost all gymnosperms are anemophilous. This is followed by insect pollination known as entomophily, whereby pollen is transferred within and between flowers. Bird pollination is a key transfer mechanism for many species and is known as ornithophily. The final class includes various vertebrates, like bats and monkeys, and is known as zoophily. In protected forests ecosystems around the world seed production can continue if all elements for successful seed set remain in place. This is, however, not the case in managed natural forests where selective harvesting and logging operations remove mature seed trees, thereby disrupting seed production and reducing genetic diversity. This has the potential to change the species composition of the recovering forest and ultimately the ecosystem.

More specifically, the production of hardwood and softwood seed, for commercial plantation forestry in an exotic environment like South Africa, follows certain tree breeding processes from testing, selection and seed orchard development. Key elements for successful seed production include appropriate siting, followed by genetic makeup and flowering behaviour. In the case of pines species, *Pinus patula* is best suited to higher altitudes, above 1 200 m a.s.l., whereas *P. taeda* produces its best seed crops at lower altitudes with higher mean annual temperatures. Anemophilous pine species generally produce genetically diverse seed crops with contributions from the bulk of parents included in the

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orchards. This is, however, not the case with the entomophilous eucalypts that have variable flowering times and trees may skip a year or more between flowering events. This can lead to unequal contributions from parental trees and, in some cases, to selfing (self-pollination) resulting in depressed growth. Some fast facts: eucalypts typically produce between 1 and 2.5 million seeds per kilogram depending on the species and size of the seed, which is enough for between 500 and 1 000 hectares. Pine species also have a large range, with *P. patula* typically producing 99 thousand seeds, followed by *P. taeda* at 30 thousand and *P. elliottii* producing 29 thousand seed. *Corymbia* comes in at 110 thousand seed per kilogram and *Acacia mearnsii* at 80 thousand. Seed collection and processing operations are conducted by trained tree climbers or arborists to ensure effective harvesting and minimal damage to the tree canopy. Extracting maximum value from open (Cont. pg. 2)

Some thoughts (and a bit of stirring) on leadership and management

By a “has-been” academic and company director (a.k.a. Tienie van Vuuren)

It became standard practice in organisations to use fancy job titles – unfortunately, however, incumbents are often not able to deliver the output required by the position. This practice started at the top of organisations where Senior Management became known as “Executive Management”.

As the main function of any manager must be to execute, it is difficult to explain the origin of the above term. The question that follows is what then are the functions of a non-executive manager? Unfortunately, this malpractice soon filtered down the organisations structure. Sales persons became Sales Executives. Mechanics became Service Advisors and Technicians and even Cleaners at our airport toilets now sometimes welcome you to their offices!

We should stop creating fancy job titles and rather concentrate on getting the job done effectively and efficiently. This will certainly help to improve our position on the list of world competitive nations. Any work properly done is noble and deserves respect, pride and recognition. Fancy titles to boost status are not needed.

Numerous leading authors have stated that our organisations are over managed and under lead, and the difference between management and leadership has been widely analysed and dissected by academics. It is interesting to note that the background of the successful manager changed over time depending on external conditions. During the industrialisation of the 20th Century and especially World War 2, the production man was king. The main driving factor was the ability to produce. The market demand was there, human and legal considerations were not dominant. All that was needed was the ability to produce. After the war the production capability was there which had to be utilised, resulting in the need to find products which would satisfy customer needs. This resulted in the era of sales and marketing ability. This was followed by the era of efficiency in order to remain competitive (the accountants) and then the human relations era, the legal era and at present the I.T. era. The characteristics of the successful leader are much more difficult to identify and these have probably not changed so much over time. Successful organisations require leaders and managers, with leaders more difficult to find than managers. Prof. Burt Nanus (1) of the University of Southern California, many years ago identified the following skills and roles of the successful leader, which I found most useful:

- CONCEPTUAL SKILLS: Farsightedness, Mastery of Interdependence, Anticipatory Learning, High Integrity

- ACTION SKILLS: Organisation Design, Initiative, Mastery of change
- ROLES: Direction- Setter, Change Agent, Spokesperson, Coach

On a much more practical level, I found, inter alia, the following to be very useful:

- Be visible and present and lead and manage by walking around and communicating – minimise meetings and time in your office
- Be absolutely honest
- Be decisive but listen carefully to all opinions
- Be there first and on time Be humble but always confident and the boss, never forget that you are in charge and responsible

Ref (1): The Leaders' Edge. Burt Nanus ISBN 0-8092-4420-9 Published 1989 224 pages

Tree Seed (cont. from pg.1)

pollinated seed crops is achieved by combining various seed mixes, based on the individual genetic value of the trees in the orchard. Most commercial forestry companies and institutes have built up genetic resources over many years and have managed these to produce genetically improved seed for plantation development.

To manage the challenges of climate change and pest and disease threats, new seed products are being developed in an ongoing basis through controlled pollination. This is done by combining species that are ecologically separated in their natural range, to form novel hybrid combinations. Controlled pollination is a method used to isolate female floral structures and then pollinating them using pollen of known genetic origin. Some of the more well-known hybrid combinations in the industry, today, are *E. grandis* x *E. urophylla* and *E. grandis* x *E. nitens*. In the case of pines, *P. elliottii* x *P. caribaea* and *P. patula* x *P. tecunumanii*. However, numerous other novel combinations are being produced in response to climatic threats. Extensive testing is required to identify the best combinations and best individuals before commercial deployment using various propagation techniques.

The capacity to produce both open pollinated pure species seed and hybrid seed products requires a long-term investment in diverse genetic resources, seed orchards, processing facilities and trained operators to provide a sustained supply of tree seed.

Shake or Wipe – Travels in the East African Forestry Industry! – Part 1

by Tim Ross

Before boarding the 12-seater Cessna Caravan for the (usually) 1h45 min flight to Dar es Salaam, it is best to visit the recently upgraded “facilities” at Iringa airport. Here you are faced with the last important decision of your trip in Tanzania – Shake or Wipe. There is no beef or chicken on the flight. *(Photo: Forestry in East Africa often requires taking tough decisions!)*



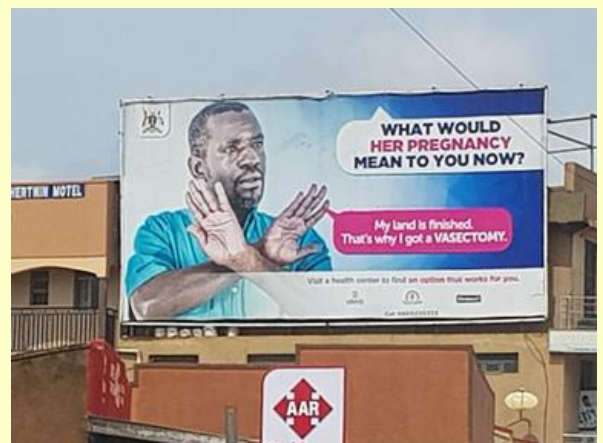
I have the privilege of working in Uganda, Tanzania and Rwanda, the eastern frontier of forestry in Africa. From the warm, wet, tropical conditions of southern Uganda to the high, cold, temperate environment of western Rwanda and the southern Highlands of Tanzania, there is always an adventure around the next bend or over the next hill – which in Rwanda is every few seconds, usually in the form of a speeding bus or Boda boda on the wrong side of the road. *(Photo: Boda boda's in Uganda can transport anything!)*



Language can be confusing. There is a tendency to switch the ‘R’ and ‘L’ sounds which creates whole new tree species, such as ‘*Pinus patura*’ and ‘*Eucaryptus glandis*’. Directions and instructions become an adventure as you are advised to “take that ‘load’ for 2 km or ‘deriver’ a ‘road’”. In hotels, you sleep in a ‘loom’. It also makes conversations around National Elections somewhat awkward, especially when there are several candidates and the competition is stiff...

Since independence, many of the excellent colonial forestry initiatives faltered, or were simply abandoned, as government focus shifted. Areas designated as forest reserves have a long history of human settlement and poor management. Deforestation is a major issue with the greatest drivers coming from agricultural and energy sectors. Land is scarce, making it difficult to justify large, commercial plantations, so other forest models need to be considered – although there seems to be some awareness of the problem. And yet, there is a culture of tree planting. Many small farmers plant trees in addition to food crops as trees are seen as a long-term investment vehicle. Government policies and changes make things difficult at times and add to the challenges that need to be overcome to run a successful commercial forestry operation.

(Photo: Pressures on land are high due to population growth)



The commercial forestry industry in East Africa is small and scattered but offers much potential to address issues of poverty and climate change in economies with already large populations that double every 15 years. Forests contribute significantly to local and national economies as well as to the livelihoods of poor rural communities often found adjacent to these forests. Downstream timber processing is largely informal and unregulated, making use of very basic equipment and manual labour.

East African forestry is a chaotic mix of the modern and archaic where flying a drone is as valuable a skill as cutting planks with a pit saw. Dragging modern forest management principles and technology into this environment is both exciting and extremely challenging. Much of what works in the South African forestry context does work well in East Africa, sometimes better, but then there are a host of issues that make it seem impossible to implement even the simplest things at times. Hard lessons have been and are continuing to be learnt. Information is hard to come by and the exact picture on the ground is hard to clarify. *(In the next issue, Tim explores specific countries)*

Complacent or concerned?

By Rob Thompson

A week or two ago, a colleague asked me if I had seen the news about the Dusi river pollution.

I nonchalantly replied that Dusi pollution was no longer news given its perpetual state of decay and filth. After all, they are even seriously considering moving the iconic annual Dusi canoe-marathon to alternative waters given the toxicity levels of the river. "No, no" he insisted, "It gets worse. Thousands of litres of cooking oil have been emptied into the river following an oil reservoir rupture into one of the tributaries".

In the days that followed, we heard reports of thousands upon thousands of fish dying along an 80 km stretch of the river, with expert forecasts of literally years of rehabilitation required to return it even to its current altered state. The rampant and unchecked build-up of litter alongside the roads and in drains leading to the river certainly don't hold much promise of assisting in the desperately required rehabilitation process.

On Sunday morning, we woke up to a dense mist enveloping our house. On exiting to investigate this unusual occurrence, I discovered that the mist actually comprised dense, acrid fumes, from the Municipal land fill that was on fire...again. Instead of crisp early morning fresh air, we were being treated to a throat-searing plastic-flavoured dose of chemical. On looking back at this occurrence, I think that the most concerning aspect was my initial reaction to the smoke-screen that I had just walked into. It certainly was not one of surprise or anger but rather an acknowledgement along the lines of "Oh damn, the dump is alight again!" A sort of ingrained- been there many times before - type of complacency.

A lung-saving evacuation was called for and we decided to take a drive down to Durban to source cleaner air. We discovered however, that the cool morning temperature was not doing anyone any favours, with the smoky inversion layer thus created, retaining the dump pollution at ground level, literally for kilometres on end.

Eventually we came across a clear patch of sky and clean air. Oh joy! But wait...its getting misty again! Yip, sporadic small wild fires in the very dry veld, alongside the highway, were making their contributions to the overall polluted day. Oh woe! This situation sadly continued all the way into Durban and even our breakfast, in an outside café area was tainted by the lingering smell of smoke.

It is understandable that after the extended dry winter months that we have experienced, late season fires are going to occur. What is concerning however, is the apparent complacency that prevails about these occurrences. People in attendance were not to be seen at any of the flare-ups we encountered. Management of our municipal dump, and I'm sure that of many others, is poor to non-existent at present, which lends itself ultimately to a toxic calamity. No-where is the public exposed to fire danger or litter warnings, and concerningly, on the legislative side, effective policing or fines for non-compliance are very mute. Politicians and officials appear to be more focused on retaining their well-paid positions than actually doing the work that these positions behest.

There I was thinking that we are in a bad state environmentally, when the really concerning news of the current Amazonian fires was released. Now this is a disaster second to none. For the city of Sao Paulo, situated thousands of kilometres away from the fires, to be enveloped in a pall of smoke, so thick, that it created darkness for hours on end, is simply horrendous. With a collective fire front that can be seen easily from space, the smallest of the multiple fires contributing thereto is likely to be individually far larger than any major fire event ever experienced in South African history...and they're spreading exponentially. With the Brazilian head of state setting a complacency level at an absolutely record high by denying the extent and ramifications of this global threat, and refusing assistance, the fires rage on, releasing centuries of stored carbon into the atmosphere and destroying ecosystems that we possibly have not even discovered as yet.

There is something insidious about environmental destruction, even that occurring on a massive scale. One sees, hears and experiences it in one form or the other, every day. That which may have concerned one at an earlier stage becomes passé given regular repetition thereof. One stops counting and reporting the repeat dump fires. Recycling of one's refuse becomes a chore because it takes effort to sort and deliver. The new outlook evolves to something along the lines of: "No-one cares anyway, so let's just dump it all on the land fill".

Those less informed about pollution ramifications may take it a step further by asking: "Wait... why do that at all. There's a ditch that will serve well as a dump". This thought process then progresses along the lines of: "Fires in the veld are going to burn out in any event. No need to extinguish them. Its tiring work so no need for me to get involved. What? The fires in Brazil? Those are so far away from us we don't need to be concerned, and anyway, fires are natural in forests".

You, as reader of this article, are likely to be very well informed environmentally and inherently concerned about what you see and hear in this regard within the arena in which you live and operate. I present it to you however, as a piece to at least stimulate conversation between you, and others less informed. As professionals in our field, we can contribute meaningfully by spreading awareness and knowledge and correcting misconceptions about matters environmental. We can set an example by that which we do and we can remind each other to not become complacent but to refresh our zeal and fervour to do that which is right despite the odds in our way.

Give a talk at a school or club about forest ecosystems and how fire affects them. If not to a school then find an opportunity to speak to individuals and share some of the knowledge that you have. Create new understanding and contribute towards amended behaviours and attitudes.

You are not going to change the world singlehandedly but you can make a difference, even a small one, with very little effort.

I have to sign off now. I'm off to sort the trash into recyclables and to send a mail to the municipality with some dump management suggestions. I'm starting to feel better already. Thanks for listening!

SAIF photo competition 2019

A reminder that the popular SAIF photo competition closes at the end of September. Please see the SAIF website for competition rules. Remember the following great prizes sponsored by Stihl:

1. STIHL RE 88 High Pressure Washer
2. STIHL HSA 25 Cordless Shrub Shears
3. STIHL SE 62 Vacuum Cleaner



SAIF Continuous Service Award: Mr Georg vd Bussche

Mr. Georg von dem Bussche has contributed to the forestry industry in several capacities stretching over a period of more than 50 years since his arrival in South Africa as a graduate forester from Germany. Despite being 80 years old, he continues to make a valuable contribution through his work done for several forestry companies, other land-owners and individuals over a wide range of activities including harvesting, silviculture, fire protection and conservation. As one of the experts regarding indigenous forests of the Southern Cape and knowledge of indigenous trees, he still offers excellent advice to landowners on the planting and conservation of trees. He has continued to share his wealth of knowledge with others and many a forester can witness to the invaluable contribution he has made over the years in their mentoring and personal development. He is known as the unofficial “gentleman” of South African forestry and has touched so many people during his formal forestry career up until 1996 and also thereafter as consultant or “forestry advisor” as he humbly refers to himself up until today. He is one of the few people who can anyone, from a basic forestry worker to a forester realise their value for the institution and feel motivated for their task to reach their full potential.

Mr. Von dem Bussche compiled a valuable document and guideline titled “Fire Assessment Guidelines” to assist in decision-making on the prioritization of pine compartments damaged during fires for clearfelling (harvesting). Through his personal surveys and by training other individuals on how to use these techniques, he has saved the forestry industry probably millions of Rands to date since 2005 in sound decision-making on which compartments are likely to survive and recover as opposed to those which should be harvested in the shortest possible time. These excellent methods and techniques have been put into practical use on numerous occasions by MTO and other forestry companies over the years and as recently again as November 2018 following the devastating fires in the Southern and Southeastern Cape.

Mr. Von Dem Bussche also still put his wealth of experience and applied knowledge over a wide field of forestry activities into good use for planning and auditing operations for several forestry companies.

His knowledge of conservation and passion for indigenous forests equipped him very well for the compilation of the baseline study for MTO in 2003, including recommendations on the identification and management of High Conservation Value Forests (HCVF) which is also covered as Principle 9 of the FSC certification auditing standard. He continued to do high-level monitoring of all the HCVF forests for many years up to 2018 when he finally handed over the task to his successor after thorough in-field training.

He continues to be an inspiration for many foresters and his wisdom and knowledge is a valuable source of information for junior and senior foresters alike.

He is also still an active member of the SAIF, participating in most activities and sharing his knowledge and experience with others during field excursions and meetings. His dedication and pure passion and infectious enjoyment of what he still does – namely almost a full day’s work for 3 to 4 days per week at the age of almost 81, makes him a worthy candidate as receiver of the “Continuous Service Excellence Award for Forestry”. (Photo: S Cape branch chair, Braam du Preez (left) hands over the award to Georg)



SA wood science student wins global award

The International Council of Forest and Paper Associations (ICFPA) has announced the three global winners of the 2018–2019 Blue Sky Young Researchers and Innovation Award. University of Pretoria Masters student Martin Wierzbicki along with Elina Pääkkönen (Finland) and Chinmay Satam (USA) were lauded for their novel wood-based research projects. They made their official presentations in Vancouver, Canada last week to industry executives at the ICFPA-hosted international CEO Roundtable, a biennial gathering of forestry and forest product companies.

Wierzbicki, an MSc graduate, carried out research on genome-based biotechnology for designer wood. His work has focused on how the genetic makeup of trees can be changed to improve how wood reacts to industrial processing in order to maximise the extraction of biopolymers such as cellulose, lignin and xylan (a complex sugar found in plant cells). Separating wood components into distinct processing streams as cleanly as possible allows each component to be used to make high value products, but is hampered by the strong associations between wood biopolymers that make industrial breakdown difficult and costly.

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September 2019 birthdays



01-Sep	POOL C.F.	19-Sep	FULLER G.M.
05-Sep	DUSTAN D.B.	19-Sep	POLLARD B.
07-Sep	STEENKAMP J.C.	20-Sep	KRAAMWINKEL E.
07-Sep	JAMES D.B.	20-Sep	MAPLANKA N.
11-Sep	CLEGG P.A.	22-Sep	RIJKENBERG N.H.
12-Sep	BUSH S.J.	23-Sep	SCHÜTTE C.
14-Sep	CHIMPHANGO A.F.A.	23-Sep	MWAROZVA M.
15-Sep	NADEL R.	24-Sep	HARVETT C.G.
16-Sep	DE SWARDT W.	25-Sep	DLADLA V.
17-Sep	FLETCHER Y.L.	25-Sep	MORLEY R.
17-Sep	CROFT P.	26-Sep	VAN VUUREN M.J.C.
18-Sep	HILL M.	26-Sep	WEIR F.
18-Sep	GODSMARK R.C.	30-Sep	MARAIS G

Newsletter compiled by Andrew McEwan