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Cycad World of Innovations will be well known to most cycad collectors in the Gauteng area, while its owner, Mr. Adolf Fanfoni, is well known in the industry nationwide. Much of what Mr. Fanfoni has learned during his years in the industry, he has presented in his book (Fanfoni 2012) titled: "Cycad World of Innovations". Building on this during the past two years an annual cycad "identification" course has been presented by Mr. Fanfoni of which I have had the privilege to be guest lecturer in. I place identification in inverted commas in the previous sentence as this course is actually a cycad recognition course. Same thing you might think, but in practical botanizing (including all plants and not just cycads) there is a big difference.

Recognition simply put is pairing the image presented to you (as a whole singularly interpreted entity) to a previously stored image with some sort of name attached to it. This looks very impressive in practice as "people who know their plants" will often glance at some tree even from a distance and say that is some or the other enormous scientific name. This however is also very intimidating and discouraging when people want to start learning their plants, which we all know is not an easy task. **These authorities often say things like, "nee man jy kyk hom net so" or "each species has its own look",** or even worse something that isn't even diagnostic but shared among many species or not always present. These strategies do work (except the latter mentioned) but they rely on a database in your brain of every other option including many exposures to the variation that they encompass. Thus you already know the answer and simply retrieve the information. Identification on the other hand is taking completely unknown material and attributing it a name from some outside source (which ironically may include asking an expert). Mostly however an expert is not on hand and we are stuck with a seemingly overwhelming image assaulting our brains.

- **We must remember we have zoo centric (animal centered) brains, and as such we are quite good at recognizing other animals. Even from a simple outline with no other detail, you will be able to recognize most vertebrates very close to species level (Figure 1).** This is because they have a set building plan. Most plants on the other hand do not. They are built up of modules of their three basic organ, stems, roots and leaves (flower being highly modified stems and leaves), which must be transformed to fulfill all its needs. Plants then grow by addition not enlargement of these modules each of which is self sufficient. This allows plants to respond to a sudden change in their environment as they are fixed in their growth position. For example, you suddenly build a wall next to a plant shading it from one side, the plant cannot migrate to a more suitable space, it needs to suddenly grow all skew towards the space where there is more sunlight. The result is that very few plants can readily be identified if we try and apply our zoo centric outlook, cycads funnily enough can be to some extent as they have a distinct growth form (but just think of how many times you were shown a fern or palm when you asked for a cycad). To identify plants then we must look at other aspects to exact our identification. We must focus on these modules of growth as they are as set as the shape of animals.

Once we know what to look at there are essentially five ways to identify material.

- **Keys** (which are available for most *Encephalartos* species)
- **Written description** (e.g. in field guides)
- **Specimen comparison** (e.g. already identified herbarium or living collections)
- **Image comparison** (e.g. photographs)
- Expert determination

Now after this lengthy introduction let's have a look at Mr. Fanfoni's recognition course. First off let me state that I consider this course an advance one, as the participants are expected to already be familiar with all the South African species including their geographic distribution. Also identifications are done mostly by doing away with 90% of the possibilities based on your reference database and only then employing some technique to decide between the final few possibilities. The first step in both identification and recognition is looking at characters and their states. This is often done intuitively and holistically by persons familiar with the plants (i.e. who recognize them) but when identification is necessary we need to specifically determine which characters we are looking at, what their states are, how these vary between species and which are diagnostic (i.e. not shared). Characters used in this course include: the silhouette or shape [more meaning the holistic image presented by the plant than the outline only], leaf color (1), leaflet shape including relative dimensions such as broad or narrow (2), growth habit (3), "basics" [e.g. cone color etc.]. More specific characters and character states are then also given including, leaflet overlap, petiole armament, leaflet base, relative leaflet arrangement (e.g. pinna-pinna angle etc.), leaflet margins, and a very nice table of single leaflets of most of the South African species including several variants.

To exact an identification species are immediately divided into one of eight groups based on characters 1–3 as listed above (e.g. Blue, broad leaflet, aerial cycads). After this the groups are split based on geographic occurrence (old Transvaal, Eastern Cape, KZN), which then lists all species possibilities. This latter split I find of limited value in the garden as the geographic origin of plants are often unknown, and if you already had enough of an inkling to know this is an Eastern Cape cycad, the previous grouping is irrelevant and one should immediately go to diagnostic character comparison. Diagnostic character comparison is presented under each species, but mainly the training course advocates the selection of one or two standout characters (in combination with the general image presented by each species), **once again focusing on recognition.** The table presented under each species consists of slightly confusing unlabeled columns, the first being the "organ" looked at, e.g. Leaf collar, the second being the character being investigated, e.g. Leaf collar color/width, the last representing the character state, e.g. brown/wide. However these are not consistently applied and some reading rather clumsily as Leaf collar|Yes|Yes-not always visible as opposed to read Leaf collar|Presence|Present but not always visible. That being said a whole range of characters are listed which are easily comparable between the species to make the final identification. **Practically in the course participants are exposed to many examples of the species in cultivation, illustrating much of the diversity found within each. This helps build their reference database that is**

supplemented by looking at specific characters when identifying particularly difficult species. However due to the state of our taxonomy in the genus there is still much overlap in these character states and diagnostic characters are still very obviously lacking between closely related species.

For my own part of the course I have presented the training I have given Nature Conservation officers on how to determine if an *Encephalartos* species is native to South Africa or not. This however includes species from Swaziland as political borders are not always natural resulting in situations such as distinguishing *E. aplanatus* and *E. umbeluziensis* from *E. villosus* which is very challenging in gardens. **The strategy I employ here is to divide all non-native species into three easily recognisable groups: (1) Soft Leaves, (2) Short/no stems + short leaves, (3) Large stems + large leaves. Again most of us familiar with *Encephalartos* will at a single glance be able to tell whether a species is indigenous or not.** I list the characters and states that we use to do this such as a lack of clear petiole, large hairy cataphylls, stalked male cones produced successively. As well as characters that are conspicuously absent such as persistent stem wool, deflexed or lobed leaflets, warty or heavily hairy cones. Once all these characters are investigated we can systemically apply other characters to each grouping to exclude South African members for e.g. in the (2) Short stems + leaves group if the leaflets are broader than 6mm (excluding *E. humilis*), and leaflets are hard (excluding *E. villosus*), and leaflets are blue-green (excluding *E. caffer*) and not heavily dentate (excluding *E. cupidus*) we can relatively safely say the species is not indigenous. Lastly I give a little look at all the non-native species divided into natural species groupings: *E. manikens*, *E. turneri* and *E. gratus*, *E. scmitzii*, *E. tegulaneus*, *E. kisambo*. Getting down to species level is very difficult in many of these groups as very few people are familiar with the species, and literature is very fuzzy in many cases.

In conclusion then I would recommend the course for any member of the cycad society that is familiar with the species but is looking to build up his or her reference library of the South African species. Also those members who would like to determine which characters experts are unwittingly looking at when recognising species. Also this serves as an introduction to identifying whether a species is indigenous to South Africa (and Swaziland) or not native. Lastly this serves as a very basic introduction to the diversity found outside of our borders.

Acknowledgments

For the introduction I have drawn greatly from Van Wyk & Van Wyk (2007) to which readers are advised if they wish to learn how to start learning your plants. Also Prof. Braam van Wyk's lectures on practical plant identification has played a big part on how the introduction was written.

References

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