

Permaculture Cairns Newsletter

EMPOWERING COMMUNITIES WITH SUSTAINABLE SOLUTIONS FOR 10 YEARS



Care for the Earth, Care for people, Fair share the excess

Permaculture Cairns Incorporated Web Site: www.permaculturecairns.org.au

Contact is via email at info@permaculturecairns.org.au

Due to Covid 19 the Committee has decided to POSTPONE the January Meeting.

We look forward to meeting with you on

Sunday 20th February 10am – 11.30pm

**A get together of Permaculture members, those interested in Permaculture, Gardening
and Seed Saving**

Venue: Artists at Work Gallery 29 Sheridan Street, Cairns

**Due to the uncertain times and changing Rules for Covid you must RSVP for this gathering as the venue
may change at short notice. Covid rules say you must wear a mask indoors.**

RSVP to info@permaculturecairns.org.au

The New Year will hold some interesting adventures. Just in our present Vice President and his partner Mel have purchased an acreage property and are madly planting a Tropical Fruit Plantation, lots of edible plants and building home as well as their full time jobs. We will be experiencing this property taking shape, there is so much practical knowledge to be gain from this development.

My mature permaculture garden is very productive all year and provides a “see it in action” for those that don’t have acreage. There are raised garden beds, wicking beds, green veggies and herbs in pots, fruit trees, flowers, native bees, worm farm in a bathtub, lots of compost bins and a chook house without chooks at the moment.

Last year, at the first meeting of the year, we asked attendees to choose what they would dearly love to learn. We made some suggestions, but we need you to let us what is important to you.

So bring along your ideas.

**The Permaculture Cairns Inc. AGM will be held on
Sunday 20th March 10am – 11.30am**

Venue to be advised

Please submit nominations by the 13th March to info@permaculturecairns.org.au

YOU MUST BE A FINANCIAL MEMBER TO VOTE

You can join online on the website

www.permaculturecairns.org.au

PERMACULTURE CAIRNS INC. 2022 AGM NOMINATION FORM

I hereby nominate PC member _____ for the position of _____ in the election of office bearers at the Annual General Meeting of the Group to be held on 20th March 2022 (or at any adjournment of that meeting).

Name of Nominee: _____

Signed by Nominee _____

Seconded by _____

Signed by Seconder: _____ Dated: ____/____/2022

I hereby agree to accept nomination for the abovementioned position

Signed: _____ Dated: ____/____/2022

The Tropical Veggie Patch

Gardening in the hot, wet, humid Tropics

Tropical Perennial Food Plants: Tropical perennials can give you lots of greens to eat on tap, try growing some ground covers under fruit trees, Sambung, Brazillian, Okinawa, Ceylon spinach and Kang kong, are all good plants to grow all year round. Plants for shaded areas, Rungia, Lebanese cress and Water cress. Taller plants are Sweet leaf grown for the new tips which taste like peas, Tree lettuce, Timor lettuce. The Moringa tree, Ofenga and three variety of Aibika shrubs with edible leaves. Root crops, cassava, taro, cocoyam and sweet potatoes.

Composting: Compost all kitchen scraps, but be sure to have some hay, dried leaves, wood chips or sugar cane mulch to cover the wet scraps each time you add to the compost bin. Store shredded paper and torn cardboard for when you have nothing else. Turning is possible inside the bin with a Gardenmate or a garden fork. Insert into compost and lift and shake the contents to incorporate air for the microbes. It is possible to turn the contents if it is no longer than 100mm. Worm farms are good for small households with small amounts of waste. Keep mix moist but not wet.

Wet season soil improvements: Now is time to plant a green manure crop. This is as simple as planting bird seed which has a variety of plants for cut and drop or cut and incorporating into the soil after about 6 to 8 weeks, before they set seed. Leave to decompose two weeks before planting out.

What to plant now: Try direct seeding amaranth, rocket, corn, snake beans, bok choy, gai choy, asian greens, Green Gem cucumbers, radish, melons, mustards, Timor lettuce and tropical lettuce. Herbs to plant, all the basil, Mexican tarragon, mints, garlic chives, chives, lemon thyme, thyme, oregano and spices turmeric, ginger, galangal, Cardamom, Vanilla, Pandan and five in one herb. Most plants will need some shade. Pigeon pea is great for shade if branches are trimmed off to over head height and then left to spread. Can be pruned to your needs. Edible pods green or dried.

Grow some flowers for the birds and bees: salvia, portulaca, marigold, coleus, sunflowers, basil, five in one herb, bees also love flowering native plants, flowers on palm, pawpaw especially the males, bananas, shrubs and trees. I have native bees and they love salvia and portulaca and the butterflies love pentas and ixoras.

Seedlings: It is a difficult time to plant seedlings now, as heavy rain can just smash the seedlings into pieces. Advanced plants of Egg plant, Chilli, Timor Lettuce, Basils, will survive the heavy falls. But softer leaves could be at risk. Give it a try its only a few seeds and you will learn as you go. It is too hot to germinate lettuce, rocket is a good substitute. I have lettuce bought seedlings and rocket under shade cloth now and they are doing fine.

I have been growing and selling Tropical Vegetable plants, herbs, trees, spices and flowers for over 15 years, as they are not always available elsewhere. You can message me on facebook if you need plants.

- [Jerry Coleby-Williams](#) is in [Wynnum, Queensland, Australia](#).
- [November 20, 2018](#) ·



I've put the kettle on. After the rain last weekend, Euphorbia drummondii aka caustic weed, has taken off in my nursery area and in the pavement in front of my home.

The sticky latex sap is toxic and highly irritating to skin, causing skin to become photosensitive to sunlight - and burning.

Even when this common weed is dried and dead your skin may react on contact. Never, ever wipe sweat from your face when working on this or any other species of Euphorbia.

Wearing gloves is advisable, especially for nursery workers who often have regular or extended exposure to caustic weed sap: it is also a known carcinogen.

While 15% of all plant species may be threatened with extinction, this little native is unlikely to disappear.

Boiling water kills this plant and most of its seed. And the results are instant.

Now I now why I am itchy after weeding, must remember to wear gloves.

A really interesting article on Dynamic Accumulators, at last someone is doing trials to prove this happens.

New findings further the study of dynamic accumulators



[Unadilla Community Farm](#) Send an email 2 days ago

0 8 minutes read

Authors: Ben Tyler & Greta Zarro, Unadilla Community Farm

As permaculture principles gain popularity, there is growing interest in “dynamic accumulator” plants and their potential as nutrient catch crops, “chop and drop” mulches, and fodder for home-brew liquid fertilizers. Dynamic accumulators are seen as a promising closed-loop nutrient management solution that converts common weeds into valuable nutrient sources, while reducing the need for purchased fertilizers and soil amendments.

However, up until now the term “dynamic accumulator” has largely existed in the realm of informal research, and in books on gardening and permaculture. This has led many to believe that dynamic accumulation is unproven pseudo-science, even though the accumulation of beneficial nutrients in the context of cover cropping has been extensively researched and accepted as fact. Likewise, the related field of “hyperaccumulator” plants has enjoyed over 40 years of enthusiastic research and discussion in peer-reviewed journals.

The thing is, literally speaking, hyperaccumulation and dynamic accumulation are two terms referring to the same biological process. But whereas the study of hyperaccumulation is specifically focused on the accumulation of toxic heavy metals, dynamic accumulation focuses on the accumulation of beneficial nutrients. In the context of agriculture, “dynamic” refers to the

plants' use of active transport, rather than normal diffusion, to transport a nutrient against the concentration gradient — in other words, to achieve a higher nutrient concentration in the plant than in the surrounding soil.

So, we know that mineral accumulation is real — we just need to establish clear criteria for the identification of dynamic accumulator species, as has already been done for hyper-accumulators. At Unadilla Community Farm in Central New York State, we recently wrapped up a 2-year study aiming to do just that. As first reported here through the [Permaculture Research Institute in March 2020](#), our SARE-funded research set out to define what exactly qualifies as dynamic accumulation and investigate potential applications for these plants. Two seasons later, here are the results.

First, following the framework laid out by [Robert Kourik](#) and [Dean Brown](#), the USDA-hosted “[Dr. Duke's phytochemical and ethnobotanical databases](#)” were used to compile peer-reviewed nutrient concentration data across thousands of plant species. Concentration averages were calculated across 20 beneficial nutrients, and dynamic accumulator thresholds of roughly 200% the average were set. “High ppm” values were used, as these correspond with dried plant tissue samples, consistent with hyper-accumulator thresholds. This resulted in a total of 340 plant species that have been shown to achieve nutrient concentrations high enough to qualify as dynamic accumulators. You can view the full list of dynamic accumulators, along with all available peer-reviewed nutrient concentration data, in an easy-to-navigate online tool titled “[Dynamic accumulator database and USDA analysis](#).”

Since the USDA databases receive regular updates as new plant tissue analyses make their way into peer-reviewed journals, the data set relied on for the study of dynamic accumulators is constantly growing. Nutrient concentration averages are constantly changing, too. This illustrates the “dynamic” nature of the USDA databases themselves, and the importance of stable nutrient concentration thresholds to assist in further studies and discussion of dynamic accumulators. The [dynamic accumulator database](#) will also need to be regularly updated to reflect the latest information on plant tissue nutrient concentrations and averages, and the dynamic accumulator thresholds themselves should be periodically reviewed as well, as is done in the field of hyper-accumulators.

We're lucky that the study of hyper-accumulators is far enough along that we can follow in its footsteps. But the use of nutrient thresholds and curated databases hasn't been perfected yet. For example, in the field of hyper-accumulators, researchers are still [facing some challenges](#), such as the existence of multiple competing sets of thresholds, several databases with conflicting criteria for inclusion, and additional quality control issues such as the use of “spiked” growing medium or contaminated plant tissue samples giving inflated nutrient readings. But the implementation of nutrient thresholds and curated databases of hyper-accumulator species has gone a long way in facilitating the study of these plants. We hope that the creation of the [dynamic accumulator database](#) will spur on further study of dynamic accumulators as well.

The second step of our research utilized the dynamic accumulator database to select 6 promising species for 2 years of trials at Unadilla Community Farm: dandelion (*T. officinale*), lambsquarters (*C. album*), red clover (*T. pratense*), redroot amaranth (*A. retroflexus*), Russian comfrey (*S. peregrinum*), and stinging nettle (*U. dioica*). Crop yields and nutrient concentrations in the soil, dried plant tissue, and liquid fertilizer derived from these plants were measured. This data was used to assess the potential of these 6 species for a range of applications, including subsoil nutrient extraction, topsoil nutrient scavenging in buffer strips or fallow beds, homebrew plant-based liquid fertilizer production, and nutrient-rich mulch production (aka “chop and drop” mulch). [You can access our full report on the field trials here.](#)

Perhaps most importantly, we found that plant tissue nutrient concentrations are relative to soil nutrient concentrations. Dynamic accumulators are well-suited to extract specific nutrients from fertile soil, but they aren’t going to create nutrition that isn’t there. As shown in our field trials, when grown in poor, unamended soil, all 6 trial crops possessed nutrient concentrations lower than those measured in previous studies. This confirms similar findings made by researchers of hyper-accumulators on the correlation between growing medium and plant tissue concentrations. For this reason, it is helpful to report nutrient concentrations for both plant tissue and the growing medium used. With these two data points, bioaccumulation factors can be calculated, by dividing plant tissue concentrations (in ppm) by “background” concentrations in the soil (also in ppm). It is only by reporting bioaccumulation factors for a plant species across a range of growing conditions and growing media that we can better understand how to effectively use dynamic accumulators in a larger permaculture system.

That said, even when grown in poor, unamended soil, two species surpassed dynamic accumulator thresholds. Dried lambsquarters foliage was found to possess potassium concentrations that exceeded dynamic accumulator thresholds (40,715 ppm), and liquid fertilizer made by steeping lambsquarters foliage in water for 5 days contained the highest potassium concentrations of all the trial crops (903 ppm).

Likewise, Russian comfrey foliage surpassed dynamic accumulator threshold concentrations for both potassium (52,959 ppm) and silicon (513 ppm), with similarly high potassium concentrations found in the resulting liquid fertilizer (889 ppm). This is particularly exciting because, while Russian comfrey has been known to be a dynamic accumulator of potassium, this may be the first study to reveal it’s a dynamic accumulator of silicon as well.

While the other four species studied did not surpass dynamic accumulator thresholds when grown in our field trials, there were some interesting findings. In particular, we found stinging nettle foliage to possess the highest calcium concentration of all trial crops, as well as the highest bioaccumulation factor for calcium. Liquid fertilizer derived from stinging nettle foliage proved to be very nutrient rich, possessing the highest concentrations of P, B, Ca, Cu, and Mn after 5 days of steeping compared to all other trial crops, as well as the highest nutrient carryover rates for all of these nutrients plus K and Mg, meaning stinging nettle’s nutrients are particularly soluble and well suited for liquid fertilizer.



Field trials showed stinging nettle to be an excellent source of calcium-rich liquid fertilizer and “chop and drop” mulch.

Chopping and dropping with stinging nettle also produced some exciting results. Calcium concentrations more than doubled in the 0-6” and 6-12” soil horizons, while dropping to 63% in the 12-24” soil horizon. This is consistent with the widely held belief that dynamic accumulators enrich the topsoil by extracting nutrients from the subsoil. Overall, stinging nettle proved to be very well suited to virtually every aspect of these field trials: it thrived under low-maintenance food forest growing conditions; formed a thick, weed-suppressing ground cover; produced large yields of calcium-rich foliage with multiple commercial uses; displayed excellent potential as a source of highly soluble liquid fertilizer; and showed promise as a nutrient-rich mulch as well. Redroot amaranth (also known as pigweed) is one species you probably don’t want to intentionally plant. But if you already have it growing as a weed, you might want to try brewing some liquid fertilizer out of it. Our trials showed that liquid fertilizer derived from its foliage possessed the highest concentrations and the highest nutrient carryover rates of iron and sulfur compared to all other trial crops. But due to its invasiveness, great care should be taken to harvest before it sets seed.

Dandelion possessed the highest concentrations of phosphorus and sodium of all the trial crops, both in its leaves and in liquid fertilizer made by steeping its foliage in water for 3 days. This isn’t terribly good news. Being an accumulator of phosphorus is a good thing, but while a little sodium has been shown to be beneficial for plants, many growers grapple with excess sodium in their soil. Also, possibly because of its small size and low yields, dandelion didn’t affect the surrounding soil nutrition very much, meaning it probably wouldn’t be very effective as a nutrient catch crop.

Finally, while the sixth species studied, red clover, did not surpass dynamic accumulator thresholds in our field trials, its dried plant tissue foliage did exhibit the highest concentration of iron out of all trial crops, as well as the highest bioaccumulation factor for iron. This makes sense, since red clover has been shown in previous studies to surpass the dynamic accumulator

threshold for iron. However, liquid fertilizer derived from red clover did not possess particularly high nutrient concentrations or carryover rates for any nutrient.

As our 2-year study on dynamic accumulators comes to a close, it is clear that more research is needed. Our analysis of Dr. Duke's databases and calculation of dynamic accumulator thresholds, resulting in the creation of the new [dynamic accumulator online tool](#), help lay the groundwork for further study of these plants. Like cover crops and hyperaccumulators, dynamic accumulators are proven mineral accumulators. But our field trials showed mixed results, with some species surpassing dynamic accumulator thresholds, while other plants did not live up to previously recorded nutrient concentrations. This underscores the importance of soil health in achieving high nutrient content in plants, and the need for more data on bioaccumulation factors when studying dynamic accumulators, not just plant tissue nutrient concentrations alone. Simply put, plants aren't going to produce something out of nothing, but by utilizing plants that are known to accumulate specific nutrients, we can selectively draw up nutrients that are present in the soil — making dynamic accumulation a valuable tool within a larger permaculture system.



Redroot amaranth trial row at Unadilla

Community Farm.

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Permaculture Cairns

Membership Form 2022

One year's membership fee - 1 Jan – 31 Dec:

- | | | | | |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> Household membership \$30 | <input type="radio"/> | Renewing Member | <input type="radio"/> | |
| Individual membership | \$20 | <input type="radio"/> | New Member | <input type="radio"/> |



Name(s) of all applicant(s) & DOB if under 18yrs:

.....
.....

Postal Address:

..... Postcode:

Phone(s):

Email:

Signature:

Payment may be made at Meetings, at Cairns Bank or Online Direct Deposit to Permaculture Cairns A/c at CairnsBank in Grafton Street. BSB704-966 A/c No. 100009440 please include your Surname as reference.

If you have a Permaculture Design Certificate could you please complete the following survey.

YOUR NAME:.....

Who was the Course Presenter:.....

Would you be willing to make a presentation to our Members.....

Are you interested in teaching Permaculture:.....

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