

Standardized trait lists for RTB crops for tricot protocols

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Standardized operation procedures for tricot are available for several RTB crops, developed under the tricot project - RTB Scaling Fund. They can be adapted to different projects (available in MEL). The contribution of Alliance/Bioversity was to coordinate the process to reach consensus about the traits to be included for each crop and to provide visual materials to communicate about the traits to farmers. They are made available below.

These trait lists are based on conversations with members of the Breeding CoP. Further rounds of standardization across crops and validation will refine the lists in an iterative way. For example, there are important differences between crops in terms of the number of traits. Also, a background study on PVS in RTB crops, including the traits included in different studies has recently become available (José Valle-Soto et al. <https://hdl.handle.net/10568/111047>).

Next steps:

- Publishing visual materials in an image library on <https://climmbob.net>.
- Making the questions will be available in the RTB library of ClimMob,
- Making full trait lists available in the Crop Ontology.
- Publish traits lists, protocols, images in a peer-reviewed publication.

Banana

- Field traits (agronomical performance)

Trait	Question
Plant height	Which variety has a highest trunk and which one a shortest?
Number of suckers	Which variety produces the most suckers in the mat and which one least?
Drought tolerance	Which variety needs less water and which one more? / which variety was most affected by drought?
Number of leaves at flowering	Which variety has the most numerous green leaves at flowering and which one the least?
Disease resistance	Which variety had the most disease damage?
Pest damage	Which variety had the most pest damage?
Bunch size	Which variety has the biggest bunch and which one the smallest?
Finger / fruit size	Which variety has the biggest fruits and which one the smallest?
Number of hands	Which variety has the most number of hands in bunch and which one the least?
Living (functional) leaves at harvest	Which variety has the most number of living (functional) leaves at harvest and which one the least? (a leaf is considered functional if it has more than 50% of green area).
Bunch weight	Which variety produced the heaviest bunches and which one the lightest?
Maturity (Plant crop cycle)	Which variety took the shortest time to produce bunches after planting and which one the longest? / Which variety is ready for harvesting earlier and which one later?
Ratoon crop cycle	Which variety needed the least time to produce bunches from a new sucker and which one the most?

- Consumer traits

Trait	Question
Taste	Which variety tastes best and which one worst?
Texture	Which variety has the best texture and which one the worst?
Appearance	Which variety has the best appearance and which one the worst?
Marketability	Which variety has the highest marketability and which one the lowest?
Pulp color	Which variety has the best color and which one the worst?
Easy of peeling	Which variety is easier to peel and which one harder?
Suitability for making product	Which variety is better for making a good quality product and which one is worse?

Cassava

1. Pre-harvest

Characteristic	Question
Establishment	Which variety sprouts earlier?
	Which variety sprouts later?
Vigour	Which variety is the most vigorous?
	Which variety is the least vigorous?
Mosaic Disease	Which variety shows the least symptoms of mosaic disease?
	Which variety shows the most symptoms of mosaic disease?
Brown streak disease	Which variety shows the least symptoms of the brown streak disease?
	Which variety shows the most symptoms of the brown streak disease?

2. At-harvest (12 MAP)

Characteristic	Question
Planting material	Which variety has the highest number of stems for planting?
	Which variety has the lowest number of stems for planting?
Maturity	Which variety bulks earliest?
	Which variety bulks latest?
Root Yield	Which variety gives the highest yield?
	Which variety gives the lowest yield?
Root size	Which variety has the biggest roots?
	Which variety has the smallest roots?
Root shape	Which variety has the best shaped roots?
	Which variety has the worst shaped roots?
CBSD Root necrosis	Which variety has least rotten roots?
	Which variety has the most rotten roots?

3. After-harvest (5-60 DAH)

Characteristic	Question
Taste	Which variety tastes sweetest after cooking?
	Which variety tastes sweetest after cooking?
Flesh colour	Which variety has the best flesh colour?

	Which variety has the worst cooked flesh colour?
Flour yield	Which variety yields most flour? Which variety yields least flour?
Ugali yield	Which variety yields the most ugali per unit of flour weight? Which variety yields the least yield per unit of flour weight?
Ugali colour	Which variety has the best ugali colour? Which variety has the worst ugali colour?
Ugali taste	Which variety produces the best tasting ugali? Which variety produces the worst tasting ugali?
Overall Quality	Which variety produces the best roots? Which variety produces the worst roots?

Potato

1. Pre-harvest

Characteristic	Question	Time (DAP) of assessment					
		15	30	45	60	75	90
Plant Vigour (The initial vigour of the seedling)	Which is the best growing variety?			X			
	Which is the worst growing variety?						
Bacterial wilt damage	Which variety shows the most damage from bacterial wilt?			X		X	
	Which variety shows the most damage from bacterial wilt?						
Disease and insect damage	Which shows the most damage from other diseases or pests?			X		X	
	Which shows the least damage from other diseases or pests?						
Maturity	Which variety is ready for harvesting the quickest?						X
	Which variety is ready for harvesting the slowest?						

2. At-harvest (100-120 DAP)

Characteristic	Question	Time (DAP) of assessment						
		15	30	45	60	75	90	100-120
Tuber appearance	Which variety has the best appearing tubers?							X
	Which variety has the worst appearing tubers?							
Tuber size	Which variety produces the largest tubers?							X
	Which variety produces the smallest tubers?							
Yield	Which variety gives the best yield?							X

	Which variety gives the worst yield?							
Marketability at Harvest	Which variety is the easiest to sell at harvest?							X
	Which variety is the most difficult to sell at harvest?							

3. After-harvest (5-60 DAH)

Characteristic	Question	Time (DAH) of assessment					
		5	15	25	35	45	60
Taste	Which variety tastes best after cooking?	X					
	Which variety tastes worst after cooking?						
Marketability after Storage	Which variety is the easiest to sell after storage?					X	
	Which variety is the most difficult to sell after storage?						
Dormancy	Which variety has a long dormancy?					X	X
	Which variety has a short dormancy?						
Overall Tuber Quality	Which variety produces the best tubers?						X
	Which variety produces the worst tubers?						

4. Final evaluation questions

Characteristic	Question
Overall performance	Which variety did you like best overall?
	Which variety did you like least overall?

Plant next season	<p>Which variety would you be most likely to plant next season, if you had seed?</p> <p>Which variety would you be least likely to plant next season, if you had seed?</p>
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Sweetpotato

- Field trial (overall agronomic performance)

Indicators	Question
Early vigour	Which is the best variety for covering the soil and which one the worst?
Virus	Which variety shows the least symptoms of virus diseases and which one the most?
Weevil	Which variety is the least attacked by weevils and which one the most?
Drought tolerance	Which variety has the best drought tolerance and which one the worst?
Vine persistence	Which variety has the most foliage at harvest and which one the least?
Root yield	Which variety gives the best yield and which one the worst?
Best	Which is overall the best variety and which one the worst?

- Consumer trial (overall product quality)

Indicators	Question
Taste	Which variety tastes best after cooking and which one worst?
Sweetness	The overall sweet taste perceived after swallowing
Texture	Which variety has the best texture after cooking and which one worst? (The overall firmness and softness after the first 2 chew with your molars)
Color	Which variety has the best color and which one worst? (The overall natural colour of cultivar perceived as viewed by the eye from the cortex to the exterior when cut in transverse section)
Appearance	Which one has the best appearance and which one worst?
Odor	Which variety has the best odor and which one has the worst? (The overall smell of a cultivar perceived after the first 2 sniffing through the nose)
Acceptability	Which one is overall the best and which one the worst? (overall quality of cultivar)

Yam

- Agronomic traits

Trait	Question
Leaf density	Which variety has the most leaves and which one the least?
Tuber shape	Which variety has the best shape and which one the worst?
Tuber size	Which variety has the largest tubers, the medium tubers, and which one the smallest?
Tuber surface texture	Which variety has the smoothest tubers and which one the roughest?
Tuber yield	Which variety gives the best yield and which one the worst?

Optional agronomic traits:

Trait	Question
Vigour	Which variety sprouts earlier and which one later?
Disease resistance	Which variety shows the least spotted leaves and which one the most?
Disease resistance (II)	Which variety shows the least yellow leaves and which one the most?
Pest resistance	Which variety is the least attacked by insects and which one the most?
Drought tolerance	Which variety needs less water and which one more?

- Consumer traits

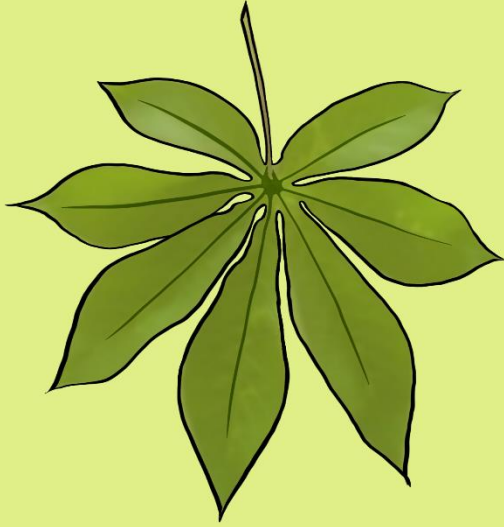
Trait	Question
Tuber flesh color	Which variety has the brightest tubers and which one the duller?
Tuber oxidation	Which tuber's variety needs more time to change colour to a darker one and which one less?
Boiled yam appearance	Which variety has the best appearance after boiling and which one the worst?
Boiled yam texture	Which variety has the best texture after boiling and which one the worst?
Boiled yam aroma	Which variety has the best smell after boiling and which one the worst?
Boiled yam color	Which variety has the best colour after boiling and which one the worst?
Boiled yam taste	Which variety has the best taste after boiling and which one the worst?
Pounded yam appearance	Which variety, once pounded, has the best appearance and which one the worst?
Pounded yam texture	Which variety, once pounded, has the best texture and which one the worst?
Pounded yam aroma	Which variety, once pounded, has the best smell and which one the worst?
Pounded yam color	Which variety, once pounded, has the best color and which one the worst?
Pounded yam Springiness or stretchability	Which variety, once pounded, has the best springiness and which one the worst?
Pounded yam mouldability or Cohesiveness	Which variety, once pounded, has the best cohesiveness and which one the worst?

Cassava drawings

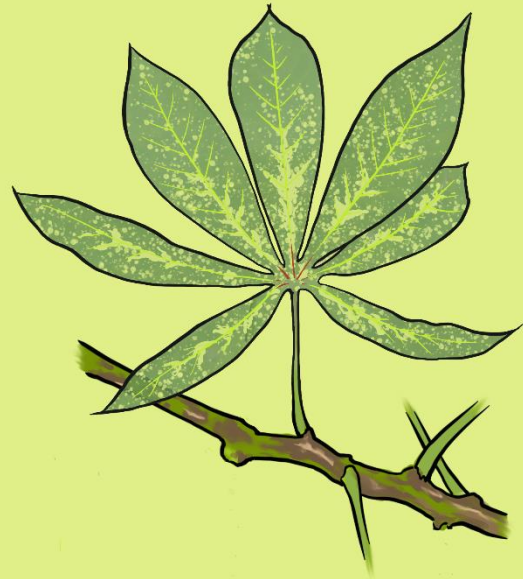
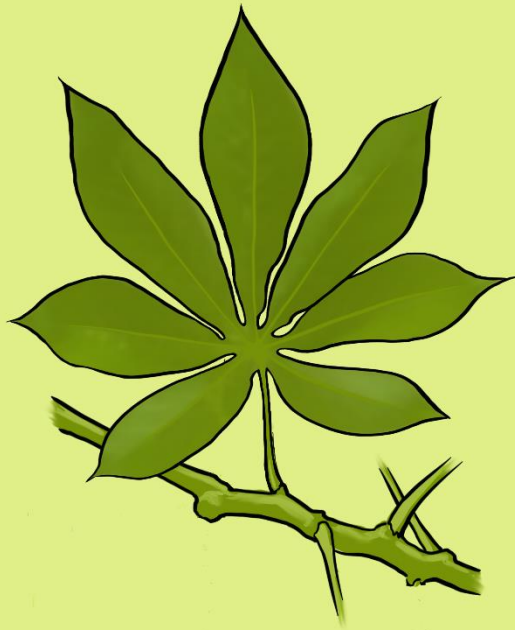
1. Establishment



3. CMD



4. CBSD



5. Amount of stems



6. Maturity



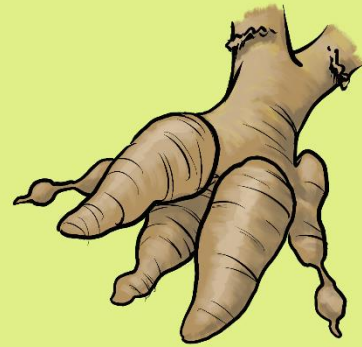
7. Root yield



8. Root shape



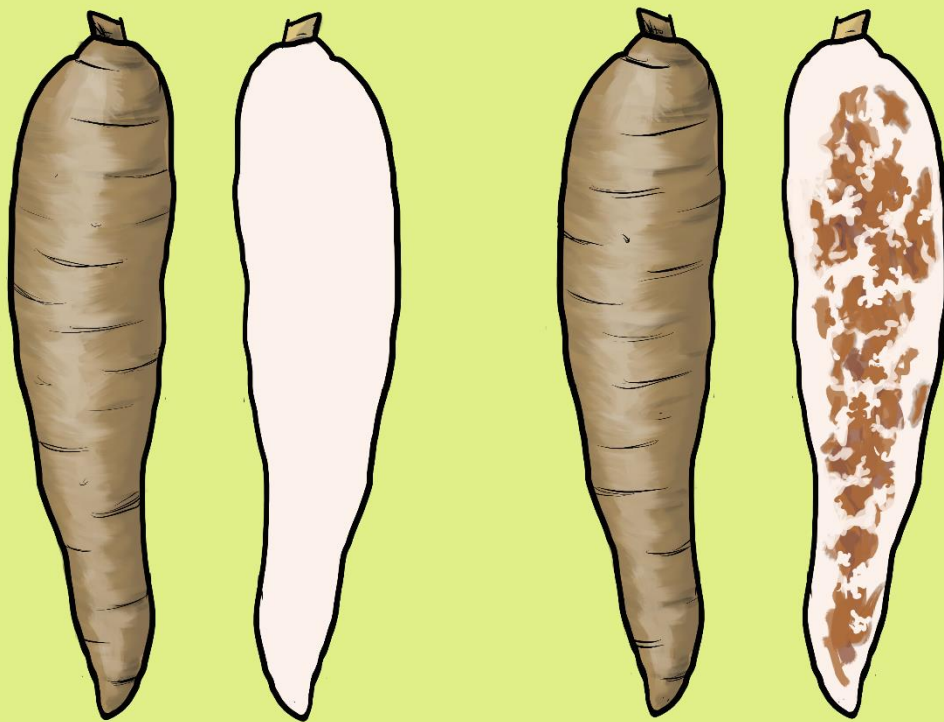
9. Root size



10. Flesh colour



11. Cbsd Root Necrosis



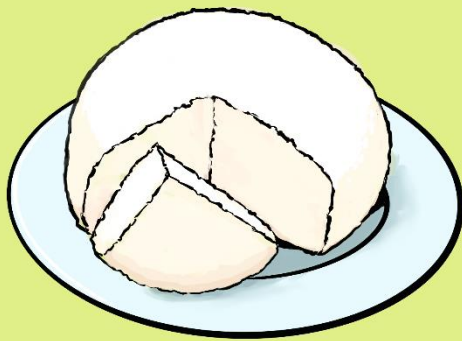
12. Cassava Taste



13. Flour Yield



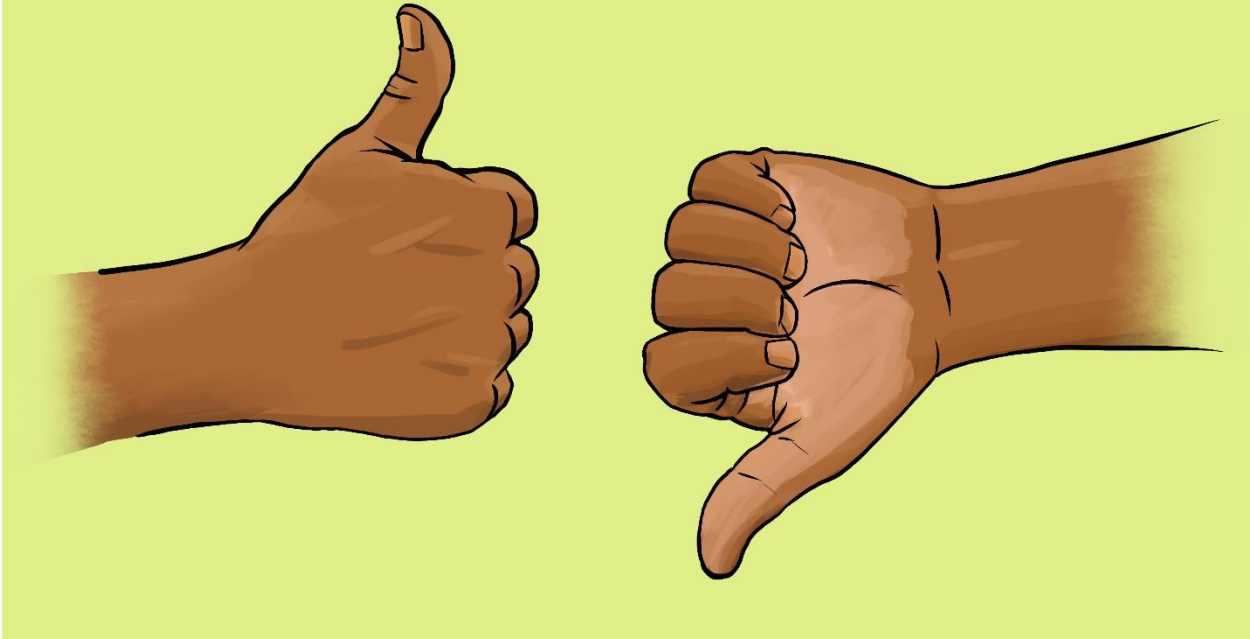
14. Ugali Colour



15. Ugali Taste



16. Overall Acceptance



Potato drawings

