## [Ngā kākano](https://www.sciencelearn.org.nz/resources/3170-nga-kakano-seeds)

## Kua ruia atu te kākano – kātahi ka aha?

Mēnā ka tau te kākano ki tētahi wāhi arotau, ka tinaku, ā, ka pihi he tipu hou.

E uhia ana te kākano e te kahukano.

Kei roto i te kākano te kikiri (te punua tipu) me tōna pātaka kai.

Ka uruuru mai te wai me te hāora ki te kākano, ka whakamahana ngā hihi o Tama-nui-te rā i te oneone, nāwai, nāwai, ā, ka pihi mai te punua pakiaka me te wana.

.A picture containing vegetable

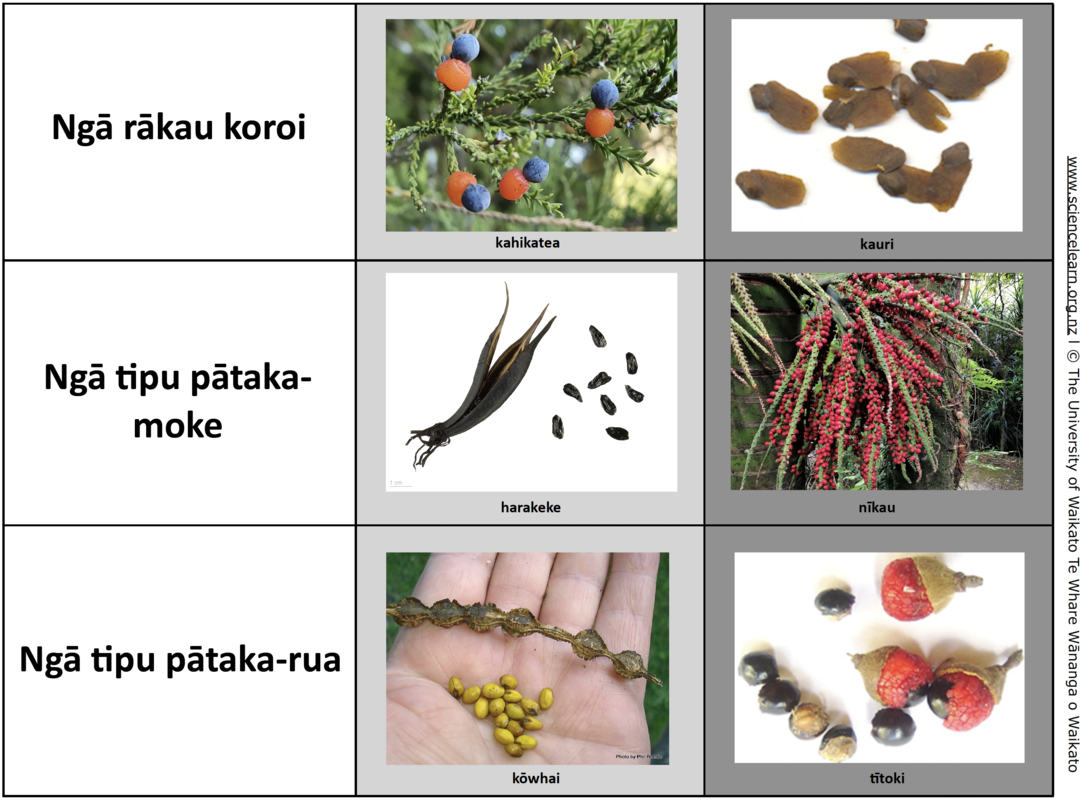
Description automatically generated

**Tinakutanga**

Ko ngā āhuatanga matua e tinaku ai tētahi kākano ko te wai, ko te hāora, ko te mahana (o te oneone me te hau takiwā).

## He aha ngā momo tupu e whai ai i ngā kākano?

He rerekē te tikanga a tēnā momo tupu, a tēnā momo tupu e whai ai i ngā kākano, mō te taha ki te whakaputu kai mā te tupu hou. Waihoki, he rerekē te putanga o te tupu hou a tēnā momo, a tēnā momo i te tinakutanga.



**Ngā momo tipu e whai ai i ngā kākano**

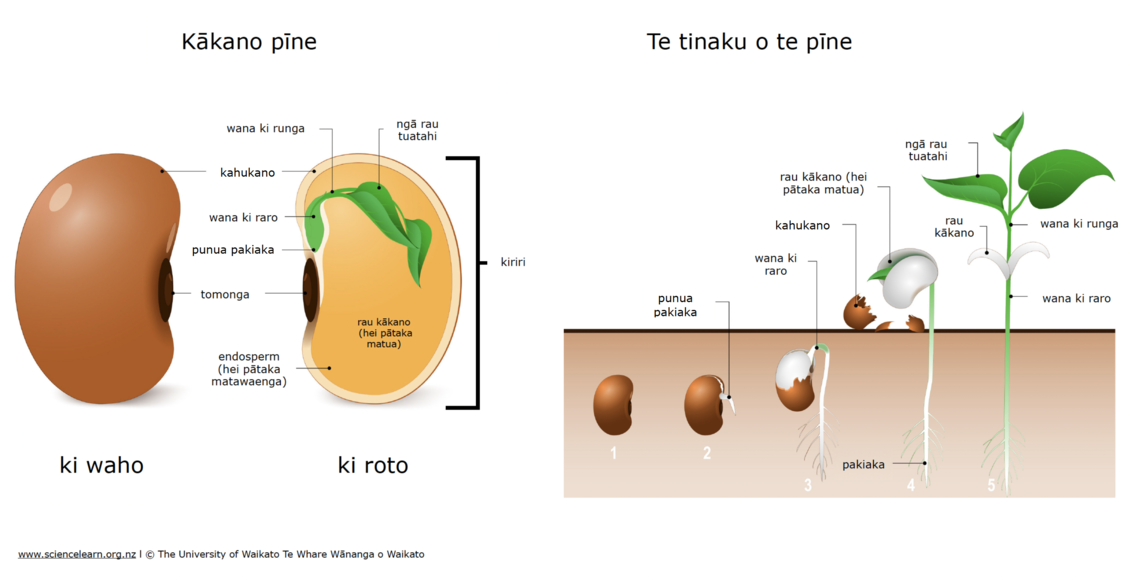
Ngā rākau koroī, ngā tipu pātaka-moke me ngā tipu pātaka-rua. Kei runga ake, ka kitea te kahikatea, te kauri, te harakeke, te nīkau, te kōwhai, me te tītoki hei tauira.

Image acknowledgements: Kahikatea, cbeard, [CC BY-NC 4.0](https://creativecommons.org/licenses/by-nc/4.0/), sourced from [iNaturalistNZ](https://inaturalist.nz/observations/39958421); [Kauri](https://www.nzpcn.org.nz/flora/species/agathis-australis/) and [tītoki](https://www.nzpcn.org.nz/flora/species/alectryon-excelsus-subsp-excelsus/), Wayne Bennett, [CC BY-NC 4.0](https://creativecommons.org/licenses/by-nc/4.0/); [Harakeke](https://commons.wikimedia.org/wiki/File:Phormium_tenax_MHNT.BOT.2015.2.23.jpg), Roger Culos, [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/deed.en); Nikau, Grey Smith, [CC BY-NC 4.0](https://creativecommons.org/licenses/by-nc/4.0/), sourced from [iNaturalistNZ](https://inaturalist.nz/observations/19884696); [Kōwhai](https://www.citscihub.nz/Phil_Bendle_Collection:Sophora_microphylla_(Kowhai)), Phil Bendle, [CC BY-NC-ND 3.0 NZ](https://creativecommons.org/licenses/by-nc-nd/3.0/nz/).

## Te tinakutanga o ngā kākano: te tipu pātaka-rua

Ko tā ngā pātaka, koirā ngā pātaka matua o roto i ngā tupu pātaka-rua. He wāhanga ērā pātaka o te kikiri, nō reira, e rua ngā huinga o ngā pūira tō ia pātaka - tētahi nō te tupu whaea, ā, tetahi nō te tupu matua.

I ngētehi wā ka tipu ngā pātaka hei rau tuatahi o te tupu hou, ā, ka pihi ake ki runga ake i te oneone i te tinakutanga. Heoi, mō ētahi atu momo, pērā i ngā pī, ka noho kei raro kē i te oneone.



**He hoahoa mō te tinakutanga o te pātaka-rua**

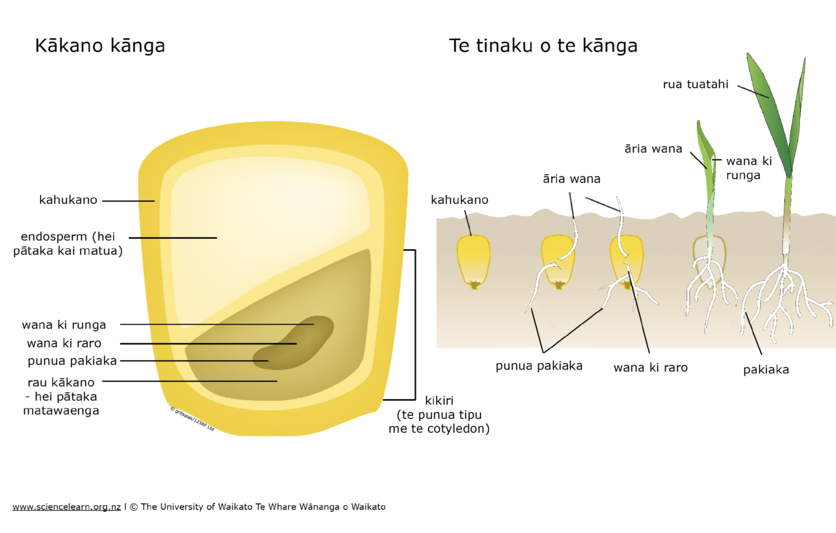
Ngā wāhanga o te kākano me te tinakutanga o ngā tupu pātaka-rua. Te pīne hei tauira. He maha ngā momo rākau pātaka-rua kei roto i ngō tātou ngahere, pērā i te kawakawa, i te manakura me te tītoki.

Ngā hoahoa/whakaahuatia nā Designua, 123RF Ltd.

## Te tinakutanga o ngā kākano: tipu pātaka-moke

Ko te ‘endosperm’ te pātaka matua kei roto i ngā kākano pātaka-moke. He pūtautau te ‘endosperm’ e whakaahuatia ana i te whakatōnga. Kei a ia ngā huinga e toru o ia pūira – e rua nō te tupu whaea, ā, kotahi nō te tupu matua.

Ko te mahi matua o te pātaka kei ngā kākano pātaka-moke, ko te whakawhiti i ngā kai mai te “endosperm” ki te wana me te punua pakiaka. Kāore te pātaka i te pihi ake te kākano. Engari anō te wana, ka pihi kē mai i te kākano kei roto i tētehi kahukano.



**He hoahoa mō te tinakutanga o te pātaka-moke**

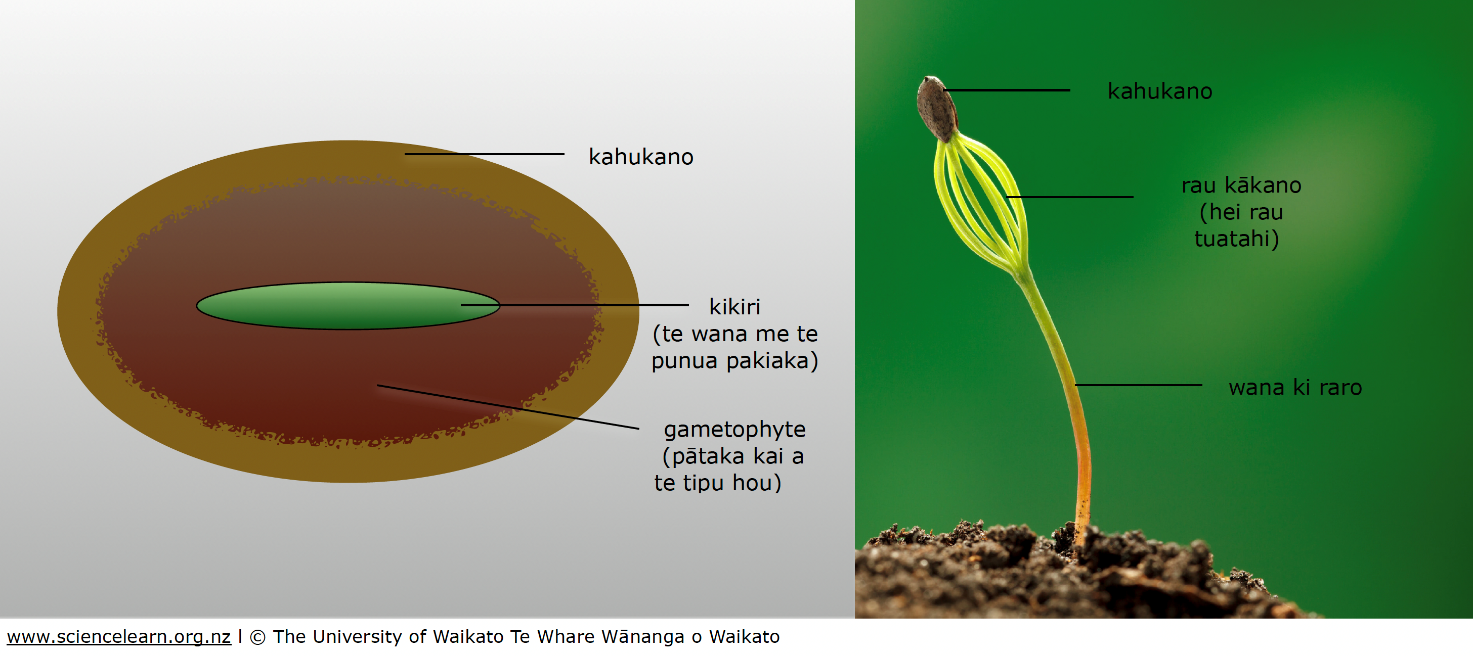
Ngā wāhanga o te kākano me te tinakutanga o ngā tupu pātaka-ru. Te kānga hei tauira. Ko ngā rākau pātaka-moke ki roto i te rohe nei, ko te nīkau me te tī kōuka.

## Te tinakutanga o ngā kākano: rākau koroī

He aha te rerekētanga o ngā kākano koroī i ngā kākano o ngētehi atu momo tupu?

Ko te ‘gametophyte’ te pātaka matua o ngā kākano koroī. Ko tā te ‘gametophyte’ he whakaputa i te pūtau hema-uwha, ā, kei a ia kotahi huinga anake o ngā pūira o te tupu whaea.

Ko te mahi matua o ngā pātaka o te kākano koroi, hei rau tuatahi mō te tupu hou. Neke atu i te 20 ngā pātaka kei roto i ngā kākano o ngētehi momo rākau koroī. Te nuinga o te wā, ka pihi ai aua pātaka ki runga ake i te oneone.



**Ngā kākano me ngā wana o te rākau koroī**

Ko te koroī te taihemahema o tēnei rōpū rākau. Mā te hau ngā kākano o te rākau koroī e kawe, ka tau ki te whenua. Nāwai, nāwai, ā, ka pihi ake he rākau hou. Ko te kahikatea me te mataī ngētehi rākau koroī kei roto i te rohe nei. Waihoki, ko te tōtara, te miro me te rimu.

Te whakaahua o te wana o te rākau koroī nā anest, 123RF Ltd.

## He kōrero kōpūtahi

* [Ngā rākau](https://www.sciencelearn.org.nz/resources/3167-nga-rakau-trees)
* [He aha hoki tērā rākau?](https://www.sciencelearn.org.nz/resources/3165-he-aha-hoki-tera-rakau-what-kind-of-tree-is-that)
* [Te haenga me te ruinga o te kākano](https://www.sciencelearn.org.nz/resources/3169-te-haenga-me-te-ruinga-o-te-kakano-pollination-and-seed-dispersal)
* [Ngā rau o te rākau](https://www.sciencelearn.org.nz/resources/3171-nga-rau-o-te-rakau-tree-leaves)
* [He pūnaha whakarōpū](https://www.sciencelearn.org.nz/resources/3168-he-punaha-whakaropu-classifying-and-identifying-plants)

Mō te tūpono he ngākau whakapuke koe ki ēnei kaupapa:

* [Seeds, stems and spores – introduction](https://www.sciencelearn.org.nz/resources/113-seeds-stems-and-spores-introduction)
* [Student-led investigations about seeds](https://www.sciencelearn.org.nz/resources/111-student-led-investigations-about-seeds)
* [Seed dispersal](https://www.sciencelearn.org.nz/resources/103-seed-dispersal)

## Ngā hono

* [Kākano](https://paekupu.co.nz/word/kakano) – Paekupu
* [Calendar for seed collecting – trees: ecosource seeds](https://www.doc.govt.nz/get-involved/run-a-project/restoration-advice/native-plant-restoration/ecosource-seeds/collection-and-propagation-guide-trees/calendar-for-seed-collecting/) – Department of Conservation Te Papa Atawhai
* [Native seed bank](https://www.rnz.co.nz/national/programmes/ourchangingworld/audio/201806202/native-seed-bank) – RNZ
* [Seed collection and propagation guide for native trees and shrubs](https://www.doc.govt.nz/get-involved/run-a-project/restoration-advice/native-plant-restoration/ecosource-seeds/collection-and-propagation-guide-trees/) – Department of Conservation Te Papa Atawhai

**He whakamihi**

Tēnei te mihi nui ki a Mokoro Gillett (Tumuaki o Te Wharekura o Te Rau Aroha) rāua ko Norman Mason (Manaaki Whenua – Landcare Research).