



吉娃斯愛科學繪本

拉阿魯哇族語

第6集
看不見的牽絆

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吉娃斯愛科學

拉阿魯哇族語版

第六集 看不見的牽絆



族語全文朗讀



英語全文朗讀



華語全文朗讀





kuakita pulaʻvua ta'ia



So Small You Can't See



看不見的牽絆





Apɛ nua Saɛpɛna maitɛahlɛ ucani
malicɛcɛ tamatitu.



Giwas and Behuy found a little black
puppy.



吉娃斯和飛卉撿到一隻小黑狗。





CaꞱꞱna pau tamatitu malicꞱꞱna cacalaisa,
saparungahla tamatitu malicꞱꞱna,
“hlasꞱꞱsꞱma”, macua “hlasꞱꞱsꞱma”
naia sipialangꞱlangꞱ hla'alua nan “cumi'l”.



Behuy fed the dog and named it Nalu. In
the Atayal language, Nalu means “black
bear”.



飛卉餵小黑狗吃東西，叫小黑狗「嘎魯」。
「嘎魯」在泰雅語是「黑熊」的意思。





Apuna ruavici cumi'i puaili salia,
cumi'ina maiakaka hlitarapurua
ina'ana hlarangirangi.



Giwas brought Nalu home.
Nalu chewed some cloth that
Mother had woven.



吉娃斯帶嘎魯回家。嘎魯咬壞了媽媽
織的布。





umarucarucak̄a ina'ana, sariva Ap̄na
cumi'ina musa micuhlu.



Mother got angry, so Giwas had to grab
Nalu and run away.



媽媽生氣了。吉娃斯只好抱著嘎魯逃走。





apumia sasuanan paupangꞥ cumi'i,
ucaniika kualivavalꞥa Avina.



The two kids begged Bayan to adopt
Nalu, but he refused.



兩人拜託巴彥收養嘎魯，但是巴彥
不答應。





Apɛ nua Caɛpɛna hlatumua mahlava
cumi'ina marikua hluhlunguna apasina, maci
apasina maipuhlipuhli ia kutalɛmɛlɛmɛ'ai
marua cucu'u umaupangɛisana.



Giwas and Behuy wanted to take Nalu to
the river for a bath. Maybe it would be
easier to find a new owner if he was clean.



吉娃斯和飛卉想帶嘎魯去河邊洗澡。也許
乾淨的樣子比較容易找到新主人。







kutuahl̥a cumi'ina mahlukua pat̥k̥
hluhlungu, mak̥r̥k̥r̥a Avina amihla,
t̥t̥r̥ apala hlakana'ana rahl̥ng̥ intavang̥,
aruamiaaisana marakauru sahlumu.



“You can’t take Nalu to the riverside!” Bayan
said nervously. He told them to get taro leaves
to scoop water out of his water basin.



「不可以帶嘎魯去河邊！」巴彥很緊張地說。
一定要他們摘山芋葉回來舀水甕的水。





maingutahl̥a Ap̥na mapuhli rahl̥ng̥,
malalangihli, malihl̥hl̥hl̥, ma hlimitahluruisa
rahl̥ng̥na takumalangihlu, Cḁp̥na
maingutahl̥ ḁr̥ rahl̥ng̥, mataingal̥a tapḁisa
malangihlu, tam m̥l̥ng̥s̥isa, ma hlimitahluruisa
rahl̥ng̥na mataingal̥a malangihlu.



Giwas picked some clean taro leaves, light green,
and round, with a shallow depression. Behuy
picked dirty leaves, dark green, and longer with a
deeper depression.



吉娃斯摘了很乾淨的葉子。粉綠色、圓圓的，凹的地方
比較淺。飛卉摘到髒髒的葉子。深綠色，葉子比較長，
凹的地方比較深。





kumita cumi'ina rahləŋɣə tumua
ma'ərɛɕɕ, makacania Avina
uramangɣisana.



When Nalu saw the leaves, he tried to
chew on them too! Bayan stopped him
quickly.



嘎魯看到葉子就想咬。巴彥急忙阻止牠。







usuangana'iau hlipaiŋgətəhləisa
Caɸpɸ cahlu'una pi takuliacɸ, anua ia
uavalə tihla'ahlə.



The leaves Behuy had gathered were
giant elephant's ear, which are
poisonous to eat.



原來飛卉拿的是有毒的姑婆芋葉，吃了
會中毒。





amihla Ap̄na: maci kumita kani'i usua
rahl̄nḡna, akuaini pusua siakitaisana.



“How can you tell the difference by
looking at the leaves?” Giwas asked.



「只看到其中一種葉子時要怎麼分辨呢？」
吉娃斯問。





ahlahlapa rahlungʻ intavangʻna pi
ukuhlucu, tuahlʻ mupucuisana sahlumu,
kani'i sahlumuna maru ahlahlapaisa
intavangʻna mitilihli, amihla Avina.



“The surface of the taro leaves have fine
nanoscale cilia hairs that cause water droplets
to collect and roll around.” Bayan said.



「山芋葉子上面的奈米級纖毛讓水聚集成水珠，
在葉子上面滾來滾去。」巴彥說。





sasuana mait̚t̚r̚isana pumaraiah̚ ari,
kupautuahlangia rahl̚ng̚ cahlu'una pi
ukuhlucu, tumimahlaka “naimina”, tam
mamainia ukuhlucuisa, tam masasangar̚a
aruuaina, ausi'ai sa'au aan̚.



The two kids looked closely, but couldn't see
the hairs. Behuy got excited when he heard
the word “nano” because he thought it was a
delicious food.



兩人看了半天，看不出葉子上有毛。聽到「奈
米」，飛卉很開心，以為是好吃的食物。





amihla Avina, naimi naia ihlaisa sapumia
mamaiini mɛlɛngɛsɛ, marumia vulaihli
kumita kupautuahlangi.



Bayan laughed and said: “A nanometer is
a very, very small measurement of length,
you can’t see it with the naked eye.”



巴彥笑著說：「奈米是很小很小的長度單位，用眼睛是看不出來的。」







naimina taininia ikamainiisa? amihla Avina,
rahlungu intavangu na maci aparaiahlan parana
tarikangihli maranaru ia, ukuhlucu rahlungu na
ausicu ukuhlucu cumi'iina mulungusisa.



How small is it really? Bayan said: “If the taro
leaf was as big as the ancient battlefield, the
cilia hairs would be the size of the smallest hairs
on Nalu’s body.”



奈米到底有多小？巴彥說：「如果把山芋葉變成像
古戰場那麼大，葉子上的纖毛就變成像嘎魯身上最
細最短的毛一樣長。」





tiaraisa ukuhlucu mamainina tuahl
maripucu sahlumu?



Why do the cilia hairs turn water
into droplets?



為什麼纖毛可以聚集水珠呢？





rahlɛngɛ intavangɛna maci parataisa kumita
ia taratuahlɛa ma ahlahlapa rahlɛngɛ kuasalisi,
ma aucaucaniisa hlimitahluruna, ma
ahlahlapana kumakitakia mapuahlɛ miungu
malimahhlɛ ausi takɛmɛnɛna.



If you magnify the taro leaves, you can see that
the surface is uneven. Each protruding structure
has needle-like waxy structures 20 to 50
nanometers in size.



如果把山芋葉變很大來看，會看到葉子表面其實是凹
凹凸凸的。每個凸出的地方，上面又有20個到50個
奈米那麼小又像針一樣的蠟質東西。





sahlumuna kuarumukua miaɬɬɬ
kana'a ausi takɬmɬnɬna, ihlaisesa'aimanai
naimina, mataingalicua sahlumuna
kuarumuku iacakici rahɬɬngɬna.



Water “doesn’t like” to touch those waxy
structures.



水「不喜歡」和葉面上那些蠟質東西在一起。
可是因為「奈米」的關係，水就更「不喜歡」
貼在葉面上。





amihla Ap̄na, mataingal̄ maini i
naimina? tam hliulavalavai?



Giwas said: “Isn’t nano really small?
How can it have such a big impact?”



吉娃斯說：「奈米不是很小嗎？有那麼
厲害嗎？」





amihla Avina: ma ahlahlapa rahlunguna ma
aucaucaniisa hlimitahluruna, tumunguraisana
ausi takumununa, aratutumuhlua sahlumu
micakiciisana.



Bayan said: “All of the protruding areas on the
surface are full of nanoscale waxy needle-like
structures, increasing the contact area with water,
so the water doesn’t like to touch the leaf 's surface.”



巴彥說：「葉面上每個凸出的地方上面又長滿奈米
級像針一樣的蠟質東西，讓水和蠟質東西的接觸面
積又更多更多了。」





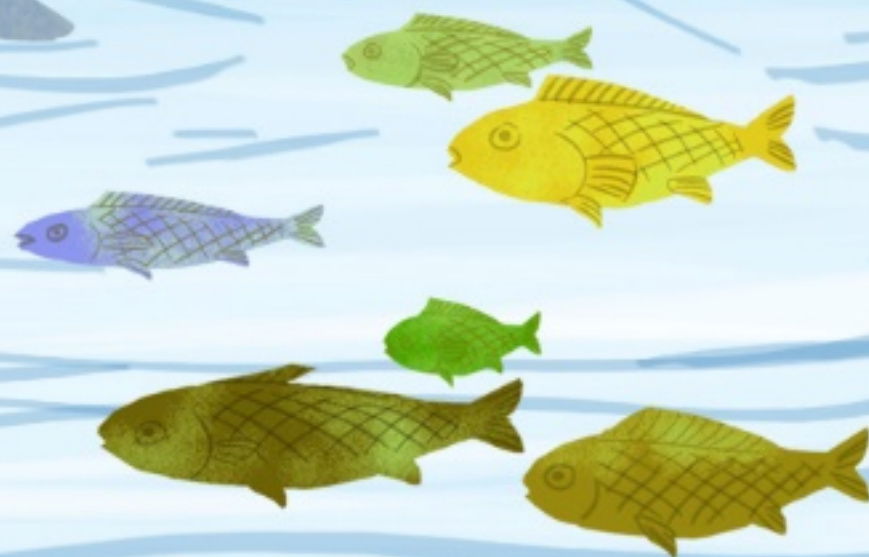
ta'iaraisaka malivutu miaꠕꠕꠕ maru ahlahlapa rahlꠕꠕꠕ
rianꠕ takꠕmꠕnꠕna, minisuacua ahlahlapa rahlꠕꠕꠕna
tuahlꠕa sahlumuna matalakiahꠕ mapapucu, maru
ahlahlapa rahlꠕꠕꠕna mitilihli, ma ahlahlapa rahlꠕꠕꠕ
sahlumuna maci milimilihli mucapi ia pitahlua malilalꠕꠕꠕ
kavuruhlu ma rahlꠕꠕꠕna, mara mapuhlicua rahlꠕꠕꠕna.



Because the water doesn't like to touch the waxy
structures, the water on the leaves collects into droplets
and rolls around on the surface. When the droplets roll
off the leaf, they bring dust and dirt with them, so the
leaf becomes clean.



因為不喜歡和葉面那麼多的奈米級蠟質東西貼在一起，葉面上的水就聚集成水珠，在葉面上滾來滾去。水珠從葉面滾下時，也順便把葉面的灰塵帶走，葉面變得很乾淨。





kani'i sitakuamiana, mualualu ia hlimaru
rahlungu tavahlihla tasahlumana, kuhlaisai
saparungahlacu sitakuamia rahlungu tavahlihla
tasahlumana, ausi valaku vutukuhlu
malalumuna, kuhlaisai, vutukuhlu malalumuna
maliahlu makahlangulu.



This phenomenon was first discovered on lotus
leaves, so it is called the lotus effect. Shark
skin has the same effect, so sharks can swim
really fast!



這種現象，最早是在蓮葉上發現的，所以又叫做
蓮葉效應。鯊魚皮也有同樣的效果，所以鯊魚才
可以游得很快！





usuanganaiau aunana! tam
masasangarɬ mɛmɛa apasinu cumi'ina.



So that's how it works! They all happily
gave Nalu a bath.



原來如此！大家開心地一起幫嘎魯洗澡。





cumi'ina tam marumuku Avina,
taka'a'angacɥ Avina.



Nalu really liked Bayan and wouldn't
stop playing with him.



嘎魯很喜歡巴彥，不停跟巴彥撒嬌。





atɬhlɛngɬa Avina hliupangiisa
kiariari mucapi mutuvuku sahlumu,
tamuucu takuliacɬ tɬkɬisa Avina.



Bayan became sad because he was
reminded of a dog named Nalu he had
as a kid who fell into the river.



巴彥想起他小時候養的嘎魯掉進河裡，
讓他難過很久。





amihla Ap̄na: ari mualualu mututaisa
Vaasuna macar̄m̄, tamuucuaku takuliac̄
tikiku, ucaniika hlipavacavacangūaku
maiatuhluhlu Vaasuna!



Giwas said: “Nainai once got really sick
and I was sad too, but I took good care of
him!”



吉娃斯說：「乃奈之前病得很重，我也很
難過，但我很仔細的照顧乃奈喔！」





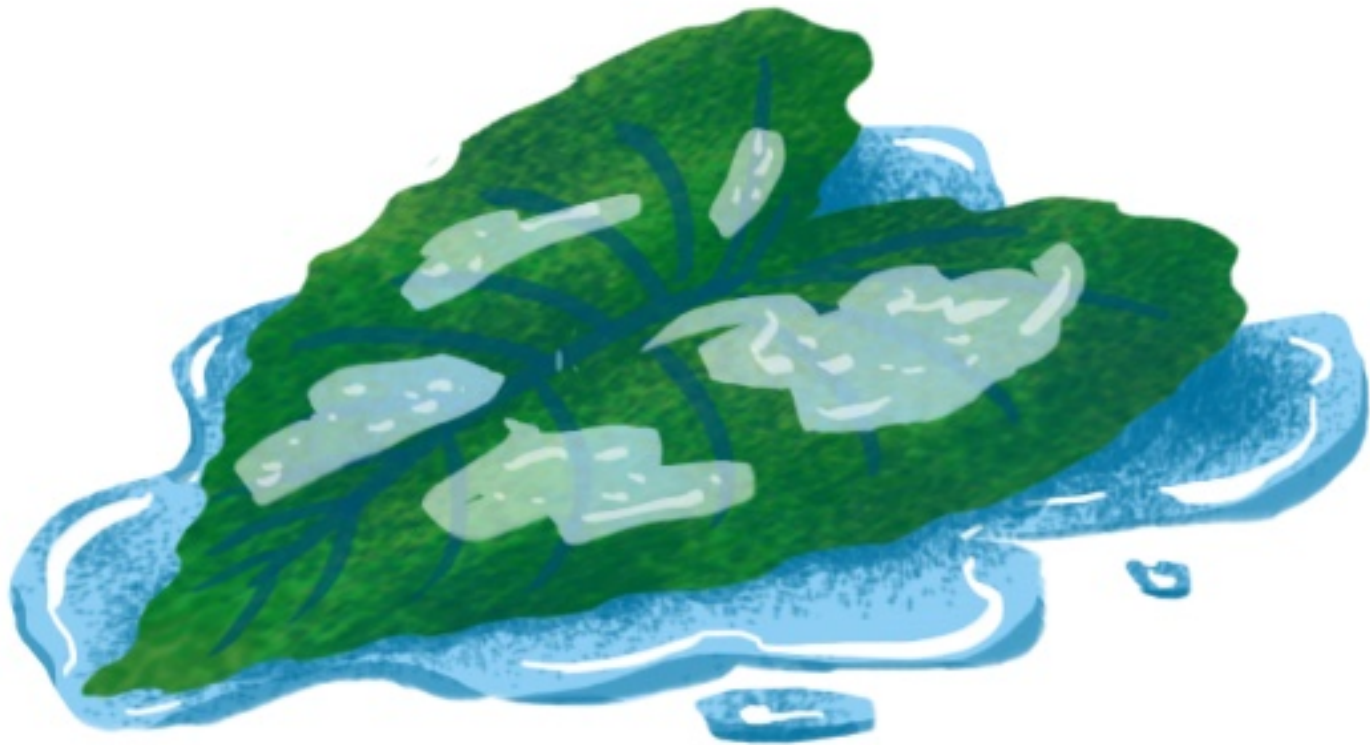
kumita aruuai Avina kupalihli'aimau aan̄
rumahlā, m̄l̄m̄l̄m̄m̄a Ap̄na at̄hl̄nḡ,
maiv̄v̄r̄nḡa marumiamana “rahl̄nḡ
intavanḡna” maiauru sahlumuna uvura
Vaasuna mima.



Bayan thought that maybe Nainai had been
poisoned, and Giwas remembered that she
had used “taro leaves” to bring him water
that morning.



巴彥正懷疑乃奈是吃壞肚子時，吉娃斯突然想起
早上還用「山芋葉」裝水給乃奈喝。





ucaniika kana'a "rahlɛngɛ intavangɛna"
ausi kuariapucu sahlumu?



But that "taro leaf" didn't form water
droplets.



但是那片「山芋葉」好像不會聚集水珠？





umarucarucak̕a Vaasuna, pitaisa
tarauuriuri, usuanganaiau mituvacua
aruuaina takuliac̕isa rahl̕ng̕ cahlu'una!



Nainai got angry and cried out.
Apparently Nainai had been poisoned
from the elephant's ear!



乃奈很生氣，叫得更慘。原來乃奈中了
姑婆芋的毒！

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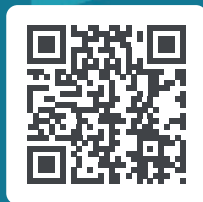
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吉娃斯 愛科學 Go Go Giwas

 粉絲專頁



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