



School of Life Sciences
The Chinese University of Hong Kong

生命科學學院



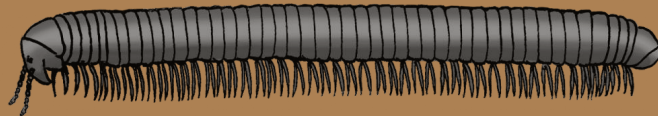
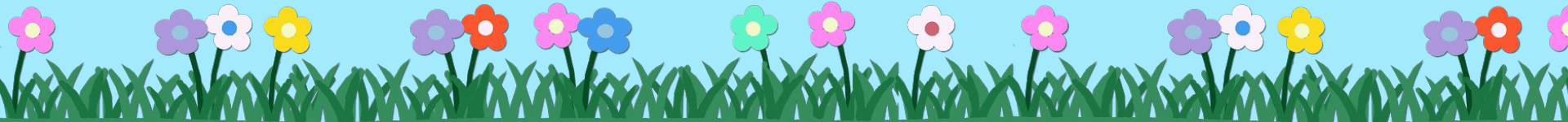
GEOGRAPHY
& RESOURCE
MANAGEMENT
地理與資源管理學系

「香港千足蟲的土壤生物多樣性」研究計劃

Hong Kong Soil Biodiversity of Millipedes

工作坊4及閉幕禮

Workshop 4 & Closing





大學
University

生命科學學院



公民科學
Citizen Science



非政府組織
NGO

中學
Secondary
Schools





School of Life Sciences
The Chinese University of Hong Kong

生命科學學院

千足蟲在港 HONG KONG SOIL BIODIVERSITY OF MILLIPEDES

香港公民科學的新方法？與中學，非政府組織，大學一起制定香港千足蟲的土壤生物多樣性多樣性：現場採集，DNA條形碼鑑定和電子平台 A novel way for Hong Kong citizen science? Working out the soil biodiversity of millipedes in Hong Kong with secondary school, NGO, and university: field collection, identification via DNA barcoding, and an electronic platform

[主頁](#)

[研究背景](#)

[千足蟲小知識](#) ▾

[採集樣本及飼養千足蟲方法](#) ▾

[科研工作](#) ▾

[聯絡我們](#)

[最新動態](#)



[夥伴學校報名方法](#)

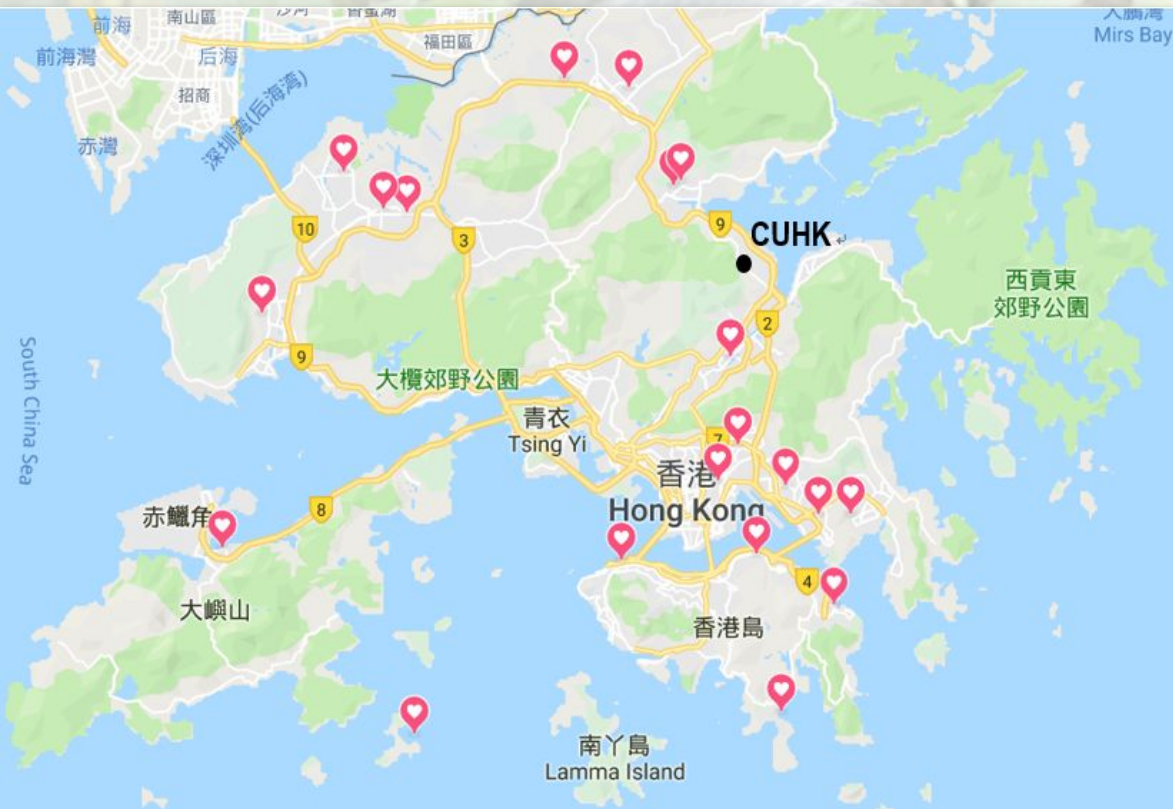
[中文 \(香港\)](#)

[English](#)

<http://biodiversity.sls.cuhk.edu.hk/millipedes>



學校名單 School List



新界 New Territories :

- 聖母無玷聖心書院
Immaculate Heart of Mary College
- 佛教大光慈航中學
Buddhist Tai Kwong Chi Hong College
- 南亞路德會沐恩中學
SALEM-Immanuel Lutheran College
- 新界喇沙中學 De La Salle Secondary School
- 粉嶺禮賢會中學
Fanling Rhenish Church Secondary School
- 仁愛堂田家炳中學
Yan Oi Tong Tin Ka Ping Secondary School
- 伊利沙伯舊生會中學
Queen Elizabeth School Old Students' Association Secondary School
- 新界鄉議局元朗區中學
N.T. Heung Yee Kuk Yuen Long District Secondary School
- 中華基督教會基朗中學 CCC Kei Long College
- 優才(楊殷有娣)書院 G.T. (Ellen Yeung) College
- 靈糧堂怡文中學
Ling Liang Church E Wun Secondary School
- 明愛陳震夏郊野學園
Caritas Chan Chun Ha Field Studies Centre

九龍 Kowloon :

- 可立中學 Ho Lap College
- 新亞中學 New Asia Middle School
- 聖公會基孝中學 SKH Kei Hau Secondary School
- 慕光英文書院 Mu Kuang English School

港島 Hong Kong Islands :

- 中華傳道會劉永生中學
CNEC Lau Wing Sang Secondary School
- 培僑中學 Pui Kiu Middle School
- 聖士提反堂中學 St. Stephen's Church College
- 聖士提反書院 St. Stephen's College

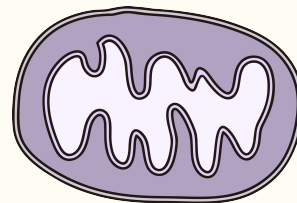
物種鑑定 DNA Barcoding

- **千足蟲 Millipede**

- 細胞色素C氧化酶亞基1 Cytochrome c oxidase subunit I (COI)

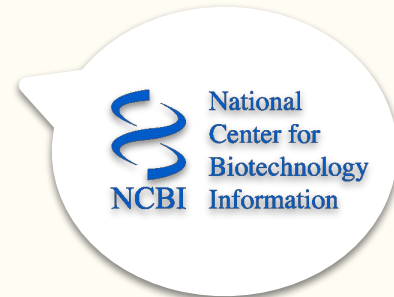
- 18S 核糖體核糖核酸 18S ribosomal RNA (18S rRNA)

- 16S 核糖體核糖核酸 16S ribosomal RNA (16S rRNA)



- **其他生物 Other organisms**

- 細胞色素C氧化酶亞基1 Cytochrome c oxidase subunit I (COI)



想知道更多可參考工作坊 2 的影片。

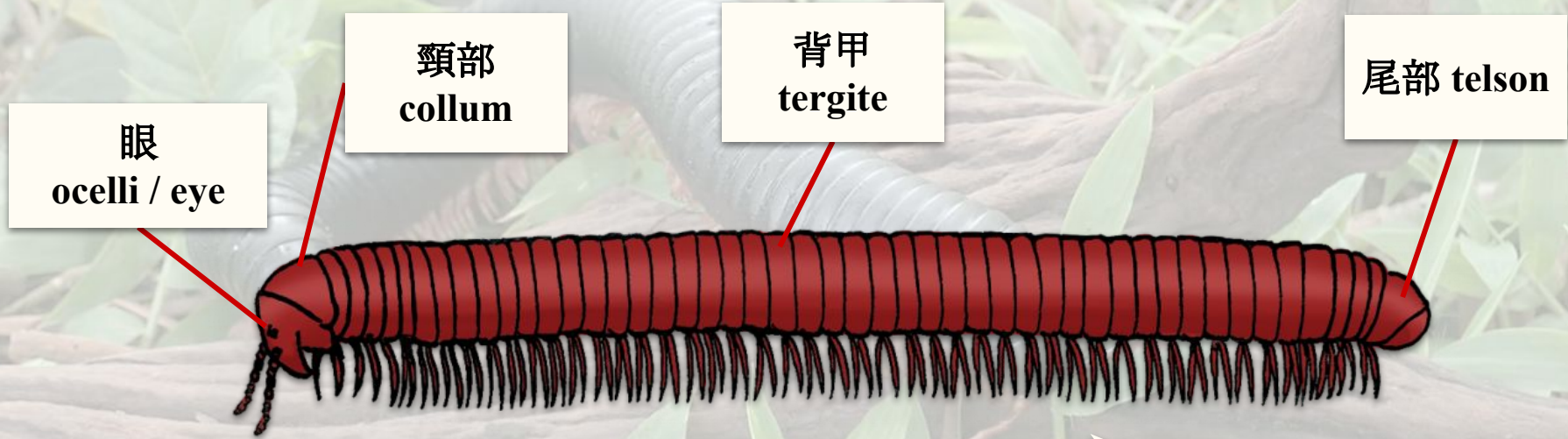
Refer to videos of workshop 2 for more detail.

A close-up photograph of a millipede, a segmented arthropod with many pairs of legs, crawling on a piece of weathered wood. The background is filled with lush green foliage, including various leaves and stems, creating a natural, forest-like environment. The lighting is soft and natural, highlighting the texture of the millipede's body and the surrounding plants.

千足蟲

Diplopoda (Millipede)

千足蟲身體結構 Body Structure of Millipede



頭部一對觸鬚用以探測化學物質來尋找食物。
The antennae on the head are used to detect chemical substances and help look for food.

大部分每節有2對腳。
2 pairs of legs are found in most segments.

千足蟲性別 Male or Female?

雄性千足蟲第7節的1或2對腳會變成性器官(視乎物種)。

One or two pairs of legs of a male in the 7th segment (depending on species) is modified to a sex organ.



生境及糧食 Habitat and Food

在較濕潤且有有機物的地方

Found in the place with organic compost and high humidity

食腐動物

Detritivore

食泥土中的有機物，以枯葉為主食

Feed on organic composts for nutrition, mainly decomposed leaves

促進有機物的循環

Facilitate organic cycle



蟲卵

千足蟲在泥土內產卵
產卵方法和數量視乎物種

具生殖能力的雄性及雌性
成蟲交配以繁衍下一代

蟲卵孵化成幼蟲

成蟲

千足蟲的生殖器官
發育完成,具生殖能力



幼蟲

第一個幼蟲階段
只有三對腳



幼蟲經歷多個階段
期間會脫殼



每一次脫殼都會令千足蟲
的體型及長度增加

千足蟲 生命週期

幼蟲繼續脫殼並成長
同時,生殖器官漸漸成熟



同時,體節及腳的數量也會增加

物理及化學防衛 Physical & Chemical Defence

分泌一些化學物質用來嚇退獵食者
Chemical substances are secreted to deter their predators

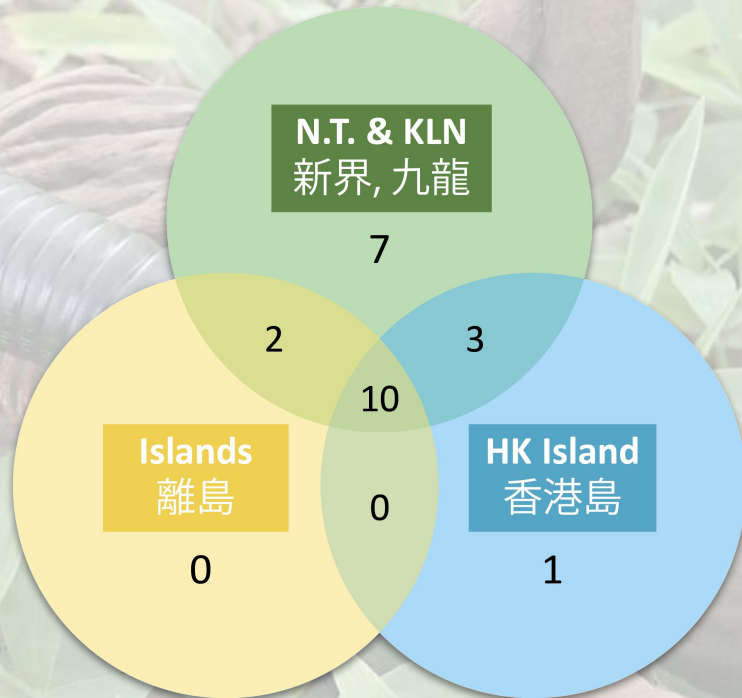


身體蜷起
Curl into a tight coil

千足蟲數據分析 Findings on Millipede

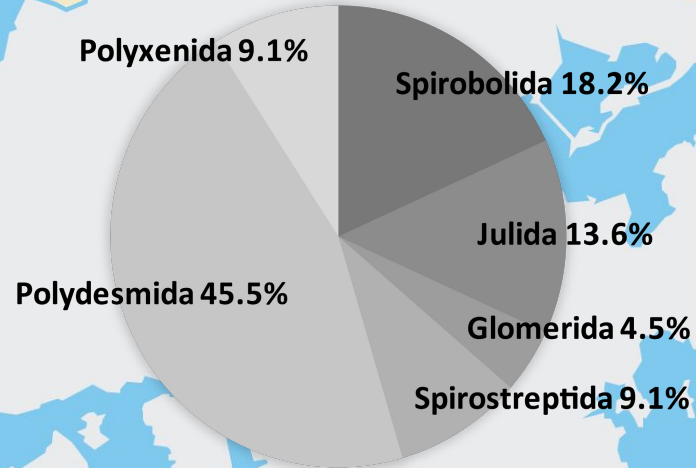
目 Order	Identified 已辨認	Unclassified 未能辨認
旋刺馬陸目 Spirobolida	3	1
姬馬陸目 Julida	0	3
毛馬陸目 Polyxenida	2	0
旋馬陸目 Spirostreptida	1	1
球馬陸目 Glomerida	0	1
蟠馬陸目 Sphaerotheriida	0	1
帶馬陸目 Polydesmida	1	9
總數 Total	7	16

千足蟲數據分析 Findings on Millipede



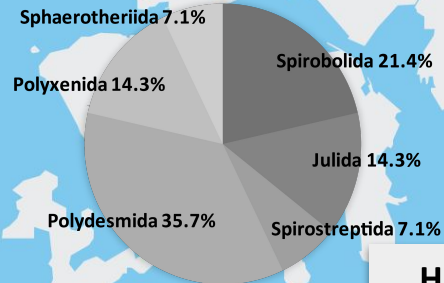
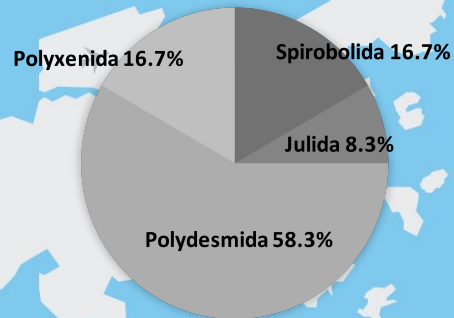
Shenzhen

N.T. & KLN; n=22



Kowloon

Islands; n=12



HK Island; n=14

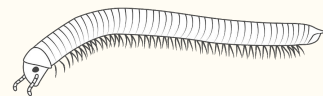
千足蟲數據分析 Findings on Millipede

倍足綱物種分類

n=23

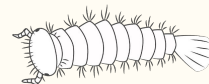
姬馬陸目 Julida

13.0%



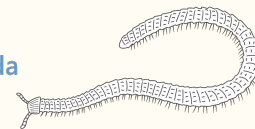
毛馬陸目 Polyxenida

8.7%



旋馬陸目 Spirostreptida

8.7%



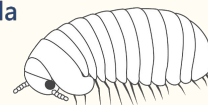
球馬陸目 Glomerida

4.3%



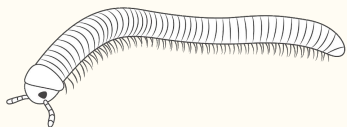
蟠馬陸目 Sphaerotheriida

4.3%



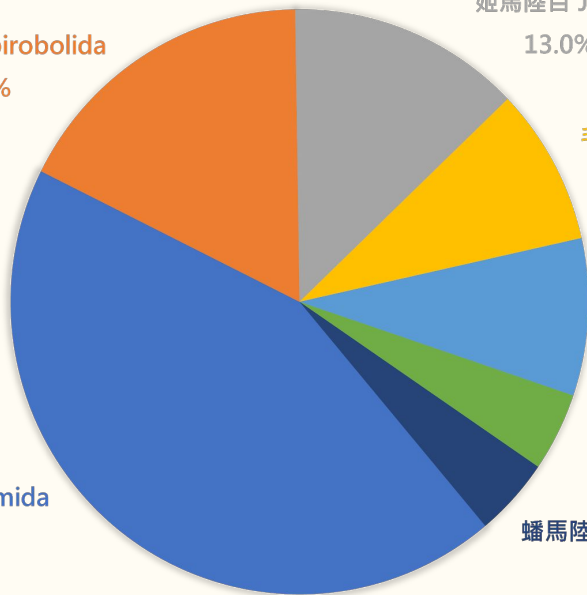
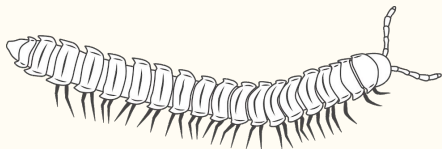
旋刺馬陸目 Spirobolida

17.4%



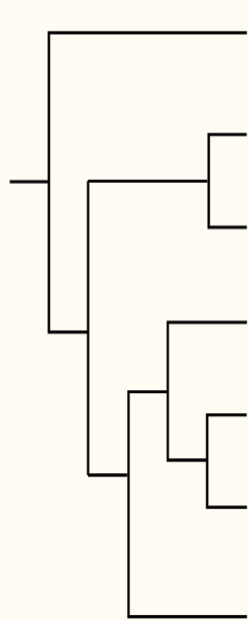
帶馬陸目 Polydesmida

43.5%

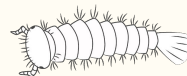


只顯示計劃中所找到的千足蟲的目。
Only show the order of the millipede found in this programme.

千足蟲 Millipede Phylogenetic Tree



Polyxenida 毛馬陸目



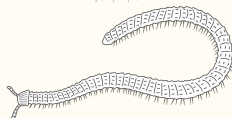
Glomerida 球馬陸目



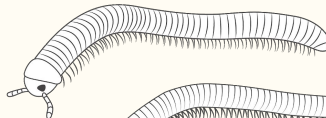
Sphaerotheriida 蟠馬陸目



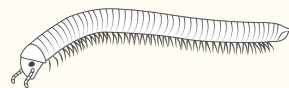
Spirostreptida 旋馬陸目



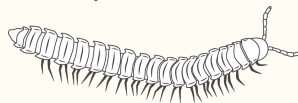
Spirobolida 旋刺馬陸目



Julida 姬馬陸目



Polydesmida 帶馬陸目



A millipede is visible in the background, crawling on a log in a forest setting with green foliage. The millipede is dark and segmented, positioned horizontally across the middle of the frame. The background is a soft-focus forest floor with various green plants and brown logs.

千足蟲品種及特徵

Millipede Species and Characteristics

毛馬陸目 Polyxenida

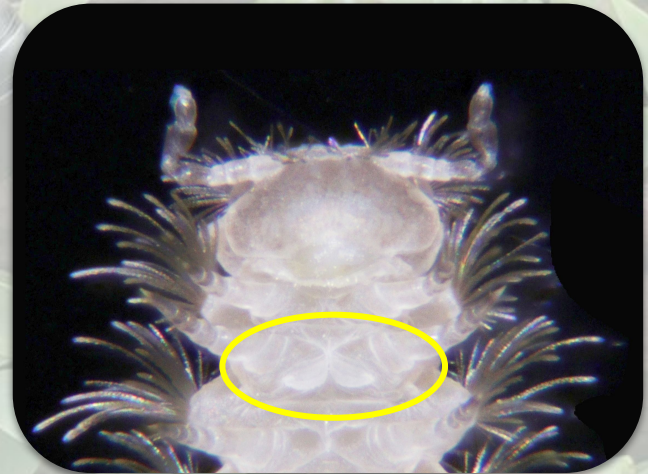


Alloproctoides remyi



Monographis queenslandicus

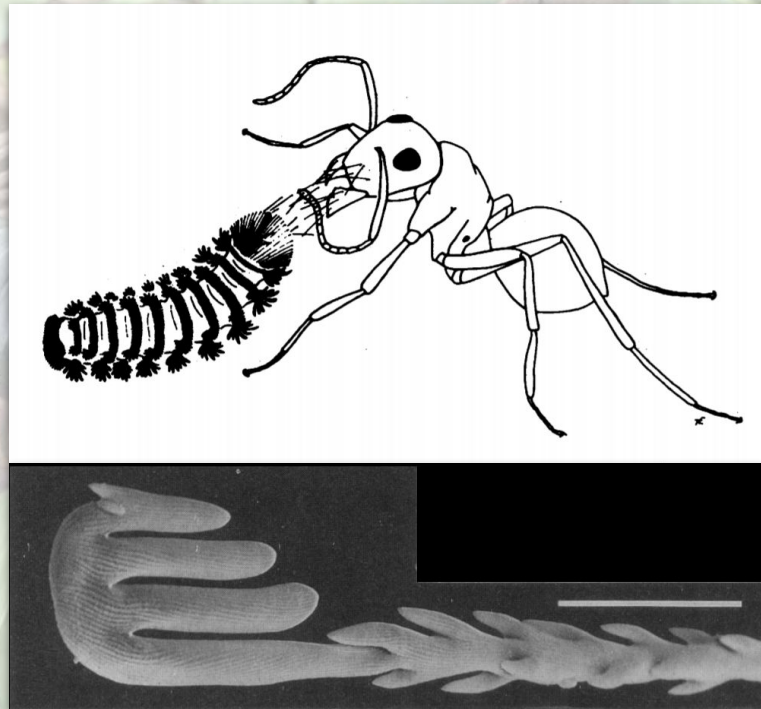
- 2-4 毫米 2-4 mm
- 身體柔軟 Body soft
- 幾顆單眼/沒有眼 Few / no ocelli
- 背甲有一束束毛 Tergites bearing tufts of setae
- 身體末端綱毛特別長 Long setae at the hind end of body
- 性器官在第2對腳後面 Sexual organ behind the 2nd pair of leg



毛馬陸目 Polyxenida

- 身體柔軟 Body soft
- 毛容易脫落 Bristles detach easily
- 毛比身體毛髮更幼細且附有小鉤

Bristles are finer than the body setae,
and have hooks



Eisner, T., Eisner, M., & Deyrup, M. (1996)

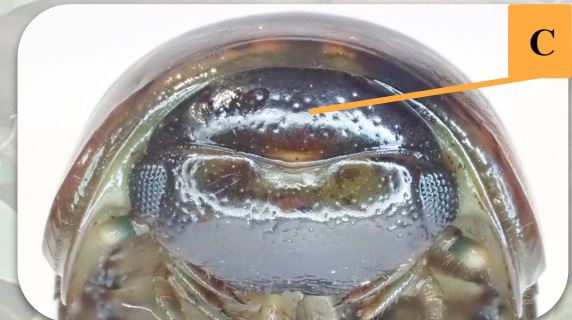
球馬陸目 Glomerida



- 12體節 12 segments
- 第2節背甲特大 Relative large 2nd tergite
- 身體堅硬 Body hard
- 有眼睛 With ocelli
- 蜷成球狀 Roll into a ball
- 雄性最後一對腳會變為性器官
Last pair of legs is modified to sex organ



蟠馬陸目 Sphaerotheriida



- 13體節 13 segments
- 第2節背甲特大 Relative large 2nd tergite
- 身體堅硬 Body hard
- 有眼睛 With ocelli
- 蜷成球狀 Roll into a ball
- 雄性最後一對腳會變為性器官
Last pair of legs is modified to sex organ

旋馬陸目 Spirostreptida

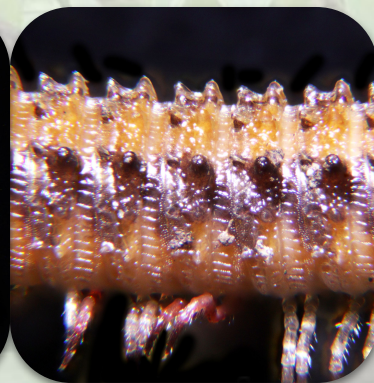
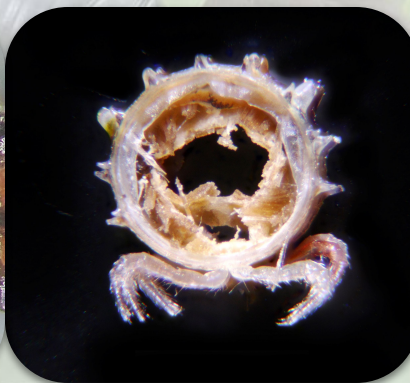
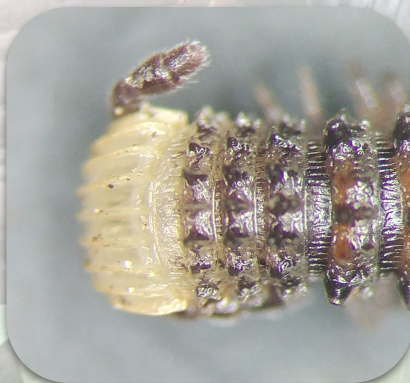


Glyphiulus granulatus 顆粒雕囊馬陸

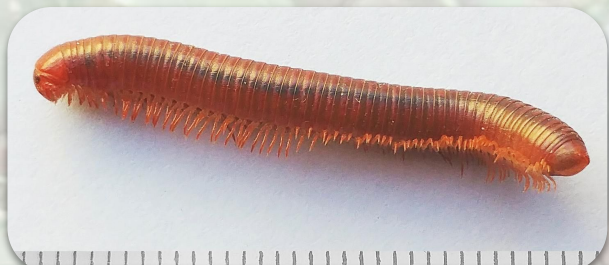


Glyphiulus formosus

- 30-90體節 30-90 segments
- 圓柱型 Cylindrical body
- 身體堅硬 Body hard



旋刺馬陸目 Spirobolida



Trigoniulus corallinus 磚紅厚甲馬陸



Paraspirobolus lucifugus 畏光側山蛩



Spirobolid 旋刺馬陸

- > 2 厘米 > 2 cm
- >30體節 >30 segments
- 圓柱型 Cylindrical body
- 身體堅硬 Body hard
- 雄性體節第7節的腳會變為性器官
Legs of the 7th segment of the male is modified to sex organ

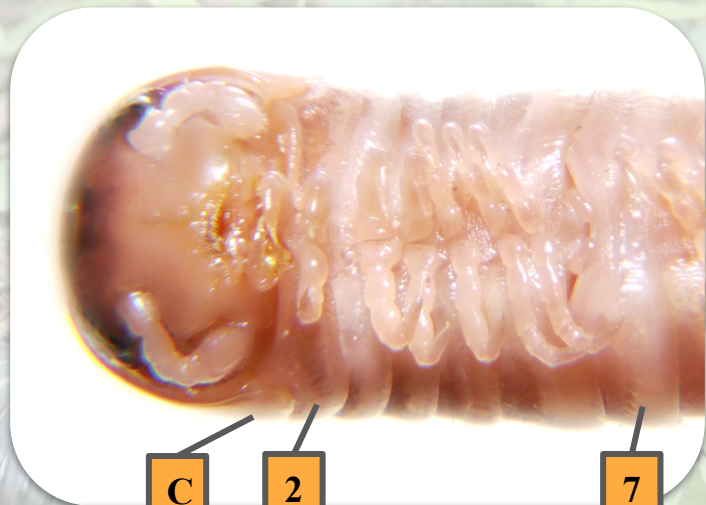
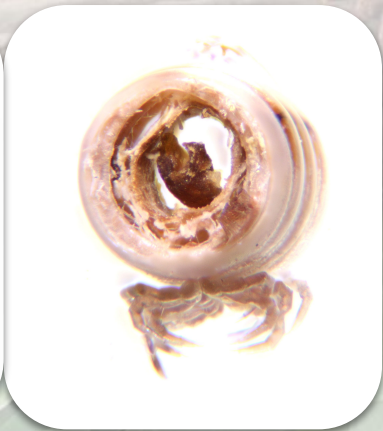
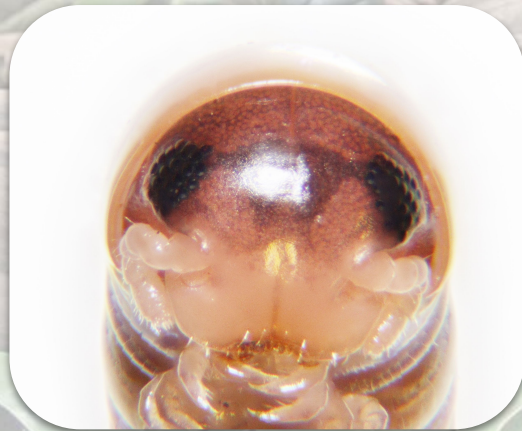


Leptogonoiusus sorornus 小紅黑馬陸

旋刺馬陸目 Spirobolida



Paraspirobolus lucifugus 畏光側山蛭



姬馬陸目 Julida



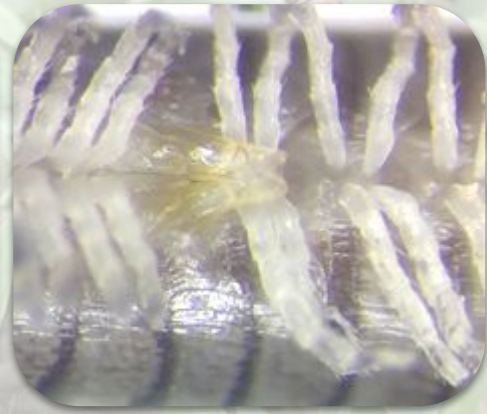
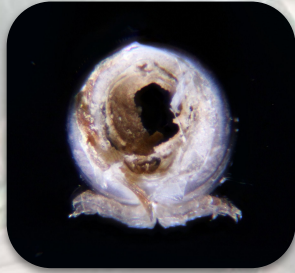
Anaulaciulus tonginus 長尾少紋姬馬陸



Julid 姬馬陸



姬馬陸目 Julida



- 1-2 厘米 1-2 cm
- >30體節 >30 segments
- 圓柱型 Cylindrical body
- 身體堅硬 Body hard
- 有/沒有眼睛 With/Without ocelli
- 雄性第一對腳呈鈎狀 1st pair of leg hook-shaped
- 雄性體節第7節的腳會變為性器官 Legs of the 7th segment of the male is modified to sex organ

帶馬陸目 Polydesmida



Helicorthomorpha holstii 霍氏繞馬陸

Polydesmid 帶馬陸

- 身體堅硬 Body hard
- 沒有眼睛 Without ocelli
- 19-21體節 19-21 segments
- 背甲有一片片 Plate-like tergite
- 雄性體節第7節的腳會變為性器官 Legs of the 7th segment of the male is modified to sex organ
- 較常見於泥面、葉底

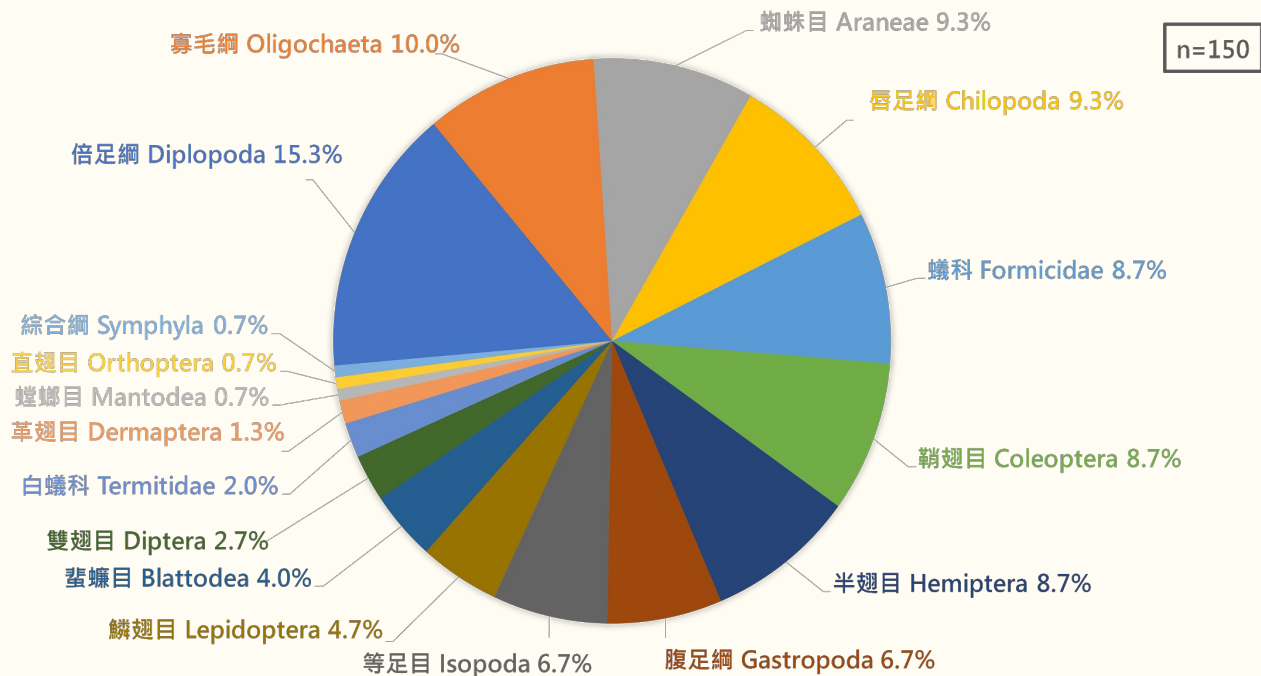
The background of the slide is a soft-focus photograph of a natural environment. It features several green plants with broad, lanceolate leaves in the foreground and midground. Interspersed among the plants are thick, brown, woody roots or stems that run horizontally across the frame. The overall lighting is natural and diffused, creating a serene and earthy atmosphere. A dark green, rounded rectangular box is centered over the image, containing the title text in white.

其他泥土生物

Soil Macrofauna

泥土生物物種 Soil Macrofauna Species

已發現泥土生物物種分類



其他生物 (類別) Other Macrofauna

Group 類別	Identified 已辨認	Unclassified 未能辨認	Group 類別	Identified 已辨認	Unclassified 未能辨認
倍足綱 Diplopoda	7	16	鱗翅目 Lepidoptera	5	2
寡毛綱 Oligochaeta	10	5	蜚蠊目 Blattodea	6	0
蜘蛛目 Araneae	8	6	雙翅目 Diptera	1	3
唇足綱 Chilopoda	7	7	白蟻科 Termitidae	2	1
蟻科 Formicidae	12	1	革翅目 Dermaptera	1	1
鞘翅目 Coleoptera	1	12	螳螂目 Mantodea	1	0
半翅目 Hemiptera	3	10	直翅目 Orthoptera	1	0
腹足綱 Gastropoda	5	5	綜合綱 Symphyla	0	1
等足目 Isopoda	3	7			

蜈蚣 (唇足綱) Centipede (Chilopoda)

Cryptops japonicus 日本盲蜈蚣

Lithobius niger

Mecistocephalus multidentatus

Otostigmus aculeatus 多刺耳孔蜈蚣

Rhysida longipes 長足衛蜈蚣

Rhysida immarginata 無稜衛蜈蚣

Scolopendra multident 多棘蜈蚣



Mecistocephalus multidentatus



Cryptops japonicus
日本盲蜈蚣



Rhysida immarginata
無稜衛蜈蚣

蚯蚓 (寡毛綱) Earthworm (Oligochaeta)

Metaphire californica 加州腔環蚓

Amyntas gracilis 優雅遠環蚓

Amyntas aspergillus

Metaphire schmaridae 舒氏腔環蚓

Amyntas wujhouensis 涪州遠環蚓

Amyntas robustus 壯偉遠環蚓

Amyntas morrisoni 毛氏遠環蚓

Amyntas corticis 皮質遠環蚓

Pontoscolex corethrurus 黃頸蝮環蚓

Dichogaster modigliani



Amyntas morrisoni 毛氏遠環蚓



Metaphire californica 加州腔環蚓



Metaphire schmaridae 舒氏腔環蚓

蟑螂 (蜚蠊目) Cockroach (Blattodea)

Blattella bisignata 雙紋姬蠊

Blattella singularis

Balta jinlinorum

Opisthoptatia orientalis 東方水蠊/金邊土蠊

Pycnoscelus surinamensis 蘇里南潛蠊/蔗蠊

Periplaneta americana 美洲家蠊



Opisthoptatia orientalis 東方水蠊/金邊土蠊



Pycnoscelus surinamensis 蘇里南潛蠊



Periplaneta americana 美洲家蠊

蝸牛及蛞蝓 (腹足綱) Snail and Slug (Gastropoda)

Laevicaulis alte 高突足襞蛞蝓

Meghimatium bilineatum 雙線蛞蝓

Achatina fulica 非洲大蝸牛

Macrochlamys sp.

Bradybaena similaris

Subulina octona 原錐蝸牛



Achatina fulica 非洲大蝸牛



Meghimatium bilineatum 雙線蛞蝓



Subulina octona 原錐蝸牛

螞蟻 (蟻科) Ant (Formicidae)



Oecophylla smaragdina
黃猓蟻



Polyrhachis illaudata 梅氏多刺蟻



Odontoponera transversa
橫紋齒針蟻

Ectomomyrmex javanus

Oecophylla smaragdina 黃猓蟻

Solenopsis invicta 入侵紅火蟻

Pseudoneoponera rufipes

Paratrechina longicornis 長角立毛蟻

Odontoponera transversa 橫紋齒猛蟻

Anoplolepis gracilipes 長足捷蟻

Polyrhachis illaudata 梅氏多刺蟻

Pheidole megacephala 褐大頭蟻

Camponotus nicobarensis 尼科巴巨山蟻

Pheidole parva 褐大頭家蟻

Crematogaster aberrans

蜘蛛 (蜘蛛目) Spider (Araneae)

Neostasina bicolor

Pirata procurvus 前凹水狼蛛

Nasoona crucifera

Parameioneta tricolorata

Trochosa aquatica 水獾蛛

Ischnothyreus peltifer

Steatoda cingulata 半月肥腹蛛

Nephila pilipes 大木林蜘蛛

Coleosoma floridanum 佛羅翰腹蛛



Steatoda cingulata 半月肥腹蛛



Pirata procurvus 前凹水狼蛛



Parameioneta tricolorata

其他 Other

白蟻科 Termitidae	<i>Macrotermes barneyi</i> <i>Odontotermes formosanus</i> 黑翅土白蟻
雙翅目 Diptera	<i>Lucilia bazini</i> 南矸綠蠅
鱗翅目 Lepidoptera	<i>Euproctis singapore</i> <i>Orvasca subnotata</i> <i>Nyctemera adversata</i> <i>Athetis thoracica</i> <i>Condica illecta</i>



Macrotermes barneyi



Lucilia bazini 南矸綠蠅



Condica illecta 大耳紋夜蛾

其他 Other

等足目 Isopoda

Burmoniscus okinawaensis

Burmoniscus kathmandius

革翅目 Dermaptera

Euborellia arcanum

半翅目 Hemiptera

Macroscytus japonensis

Eysarcoris guttigerus

Brachyrhynchus triangulus

鞘翅目 Coleoptera - 甲蟲 Beetle

Platynaspis maculosa

螳螂目 Mantodea

Tropidomantis tenera

直翅目 Orthoptera

Loxoblemmus equestris



Burmoniscus kathmandius



Euborellia arcanum



Macroscytus japonensis



Platynaspis maculosa



大學
University

生命科學學院



公民科學
Citizen Science



非政府組織
NGO

中學
Secondary
Schools



多謝大家支持！

Thank you for your support !

