CHAPTER V

Discussion and Conclusion

Taxonomic study of Characeae of Thailand was conducted, 4 genera and 25 species were identified, they were 13 species of Nitella, 9 species of Chara, 2 species of Nitellopsis and 1 species of Tolypella. Among these, Chara zeylanica the most common Charophytes found in the rice field, was the only species mentioned in previous works. For Nitella and Tolypella, no identification of species has been done. Therefore, 24 species from this study are now record for Thailand.

Among the Charophytes found in this study, Nitella and Chara showed wide range of geographic distribution in all parts of Thailand. Nitellopsis was restricted in southern region while Tolypella was found only in the centrals.

The most frequent inhabitat sites of these algae were rice field, roadside canal and pool by bridge, pool by rain in rainy season, natural lake, manmade reservoir and stream where water levels varied from 10 cm to 250 cm.

In rice field where depth of water from 10 cm to 50 cm and water was rather turbid, the species found are Chara corallina, Chara fibrosa, Chara hornemanii, Nitella allenii, Nitella dualis, Nitella heteroteles, Nitellapsis sarcularis, and Tolypella intricata.

In roadside canal, where water flows in rainy.season, water depth varied from 30 cm to 150 cm and the water was quite clear. Eight species can be found in this habitat, they are: Chara canescens,

C. zeylanica, C. braunii, C. hornemanii, C. corollina, C. baueri, Nitella hookeri and N. furcata. In pool by rain, water depth was 30 cm. to 50 cm., the water was quite clear during rainy season and dried out in the dry season. In such habitat only one species of Chara and one species of Nitella were collected, They are Chara baueri and Nitella penicillata.

In Thailand there are many natural lakes such as Khwan Phayao in northern region, Nong Han in the northeasthern region, Bung Boraphet in central and Songkhla lake in southern region. The first three lakes are fresh water all year round. Only Songkhla lake is connected with the sea, three habitats: fresh water, brackish and saline water can be found in this lake. The specimens collected from the middle part of this lake at water depth of 100 cm. to 250 cm., were Chara zeylanica and Nitellopsis bulbilifera which grew among other aquatic plants such as Potamogeton sp., Hydrilla sp., Ceratophyllum sp., Nymphaea sp., Hygrorhiza sp. and Najas sp. The specimens collected from Nong Han lake in northeast region were Nitella duthieae, N. acuminata, and N. furcata but no record for the habitat of these specimens.

Many reserviors in northern and northeastern region where water is rather stagnant and clear. There are many species found in this habitat such as: Chara zeylanica, C. fibrosa, C. globularis, C. corallina, Nitella mirabilis, N. hookeri, N. furcata, N. acuminata, N. stuartii, N. duthiea, N. translucens and Tolypella intricata. These specimens were collected from the water of 50 cm. to 250 cm. depth.

In this study only 2 species of Nitella were found growing in stream pool. They are Nitella furcata at Kao Salob National Park in Kanchanaburi and Nitella lhotzkyi at Pukadung National park in Loei where the stream is 1500 m. above sea level.

The distribution of each genus is showed in fig. 27 . Most of the genus Chara were found dispersing in central and southern region, only few species were in northern and northeastern region. Genus Nitellopsis was restricted only in the southern region. It was found in rice field in Phuket Island and Lam Pam lake, Patthalung. For the distribution of Nitella and Tolypella, from fig. 28, it was showed that most of the genus Nitella were in central and northeastern region while only 3 species were found in the southern region in Phuket Island and none in the northern region. The distribution of genus Tolypella was only in central region. It was found in reservior in Chonburi and in the rice field in Cha Choengsao.

From table III, it can be concluded that the Charophyta distributed throughout Thailand. The region where these weeds showed wide dispersion was central region which found 3 genera 16 species, they were: Chara canescens, C. globularis, C. zeylanica, C. corallina, C. fibrosa, C. baueri, C. hornemanii, Nitella flrxilis, N. mirabilis, N. stuartii, N. allenii, N. hookeri, N. furcata, N. translucens, N. penicillata, and Tolypella intricata.

In southern region the Charophyta grown in rice field, roadside canal and natural lake were identified into 3 genera

9 species, they were: Chara zeylanica, C. corallina, C. fibrosa, C. ecklonii, Nitella allenii, N. dualis, N. heteroteles, N. furcata, Nitellopsis sarcularis and Nit. bulbilifera. For the genus Nitellopsis, it could be found only in this region, one was Nitellopsis bulbilifera found in rice field beside the road in Phuket Island and the other was Nitellopsis sarcularis found in Lam Pam lake, Patthalung.

In northeastern region, 2 genera 6 species were found. Most of them belonged to genus Nitella, they were: Nitella acuminata, N. stuartii, N. furcata, N. duthiea, and N. lhotzkyi which found growing in natural lake and reservior. Only one species of genus Chara found in roadside canal in Ubon Ratchnthani, it was Chara corallina.

The Charophyta seemed to be very rare in northern region. Only one species was found, it was Chara braunii which found in the stream and pool by bridge at Chiengrai about 1,000 m. above sea level. However, at Khwan Phayao which is a natural lake fill with many submerged plants, no Charophyta could be found.

The species found in Thailand compared with those found in adjacent countries showed in table IV. In Burma, 2 genera 4 species, they were: Chara zeylanica, C. corallina, Nitella acuminata and N. furcata (Pal, 1932). In India and Ceylon, 2 genera 8 species, they were: Chara canescens, C. globularis, C. zeylanica, C. braunii, C. corallina, C. fibrosa, Nitella mirabilis and N. furcata (Zaneveld, 1940).

In Malaysia, 2 genera 4 species, they were: Chara zeylanica, C. corallina, C. fibrosa and Nitella furcata (Zaneveld, 1940). In Indonesia, 2 genera 5 species, they were: Chara globularis, C. zeylanica, C. corallina and C. fibrosa and Nitellopsis sarcularis (Zaneveld, 1940). In Phillipines, 1 genus 4 species, they were: Chara zeylanica, C. braunii, C. corallina and C. fibrosa (Zaneveld, 1940). In Indo-China, 2 genera 3 species, they were: Chara globularis, C. fibrosa and Nitella dualis (Zaneveld, 1940).

TABLE I

Chemical analysis of Chara hispida dried in air.

Constituent	Percentage	Remarks
Water	5.25	In the ashes for every
Pure ashes and silica	47.00	1,000 parts 161 are lime
Crude fat	1.80	and 1.57 phosphoric
Crude protein	4.37	anhydride.
Other carbohydrates	33.94	

TABLE II

Chemical analysis of Chara fibrosa dried in air and sand-free.

Constituent	Percentage	Constituent	Percentage
Ash	41.22	Manganomanganic oxide, Mn_3O_4	0.08
Crude protein (N X 6.25)	4.50	Calcium oxide, CaO	37.82
Ether extract	0.76	Magnesium oxide, MgO	1.19
Crude fiber	9.32	Sodium oxide, Na_2O	0.35
Pentosans	4.70	Potassium oxide, K_2O	0.58
Nitrogen-free extract	39.50	Chloride, CL	0.29
Silica, SiO_2	0.83	Carbonate, CO_3	39.00
Ferric oxide, Fe_2O_3	0.06	Total sulphur, S	0.27
Aluminium oxide, AL_2O_3	0.81	Total phosphorus, P	0.06

Table I and II from "The Charophyta of Malaysia etc."(Zaneveld, 1940).

Table III The distribution of Characeae in Thailand

	BANGKOK	SAMUT PRAKAN	CHACHOENGSAO	CHON BURI	NAKHON PATHOM	KANCHANABURI	CHIENG RAI	LOEI	UBON RATCHATHANI	SAKON NAKHON	PRACHIN BURI	CHANTHABURI	PRACHUAP KHIRI KHAN	SURAT THANI	PHANG NGA	PHUKET	PHATTALUNG	SONGKHLA
Chara																		
- canescens	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
- globularis	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- zeylanica	+	-	-	-	+	-	-	-	-	-	-	-	+	-	+	-	-	+
- braunii	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
- carallina	+	-	-	+	-	-	-	-	+	-	-	-	-	-	-	+	-	-
- fibrosa	-	-	-	-	+	-	-	-	-	-	-	+	-	+	-	+	-	-
- ecklonii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- baueri	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
- hornemanii	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitellopsis																		
- sarcularis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
- bulbilifera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
Nitella																		
- flexilis	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- mirabilis	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
- acuminata	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-
- stuartii	+	-	-	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-
- allenii	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	+	-	-
- hookeri	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
- dualis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
- heteroteles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
- furcata	+	-	-	-	-	+	-	+	+	+	-	+	-	-	-	-	-	-
- duthiea	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
- lhotzkyi	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
- translucens	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- penicillata	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tolypella intricata	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table IV The distribution of Characeae in Thailand compared within adjacent countries

	Central region	Northern region	Northeastern region	Southern region	Burma	India & Ceylon	Malaysia	Indonesia	Philippines	Indo - China
Chara										
- canescens	+	-	-	-	-	+	-	-	-	-
- globularis	+	-	-	-	-	+	-	+	-	+
- zeylanica	+	-	-	+	+	+	+	+	+	-
- braunii	-	+	-	-	-	+	-	-	+	-
- corallina	+	-	+	+	+	+	+	+	+	-
- fibrosa	+	-	-	+	-	+	+	+	+	+
- ecklonii	-	-	-	+	-	-	-	-	-	-
- baueri	+	-	-	-	-	-	-	-	-	-
- hornemanii	+	-	-	-	-	-	-	-	-	-
Nitellopsis										
- sarcularis	-	-	-	+	-	-	-	+	-	-
- bulbilifera	-	-	-	+	-	-	-	-	-	-
Nitella										
- flexilis	+	-	-	-	-	-	-	-	-	-
- mirabilis	+	-	-	-	-	+	-	-	-	-
- acuminata	-	-	+	-	+	-	-	-	-	-
- stuartii	+	-	+	-	-	-	-	-	-	-
- allenii	+	-	-	+	-	-	-	-	-	-
- hookeri	+	-	-	-	-	-	-	-	-	-
- dualis	-	-	-	+	-	-	-	-	-	+
- heteroteles	-	-	-	+	-	-	-	-	-	-
- furcata	+	-	+	+	+	+	+	-	-	-
- duthiea	-	-	+	-	-	-	-	-	-	-
- lhotzkyi	-	-	+	-	-	-	-	-	-	-
- translucens	+	-	-	-	-	-	-	-	-	-
- penicillata	+	-	-	-	-	-	-	-	-	-
Toypella intricata	+	-	-	-	-	-	-	-	-	-

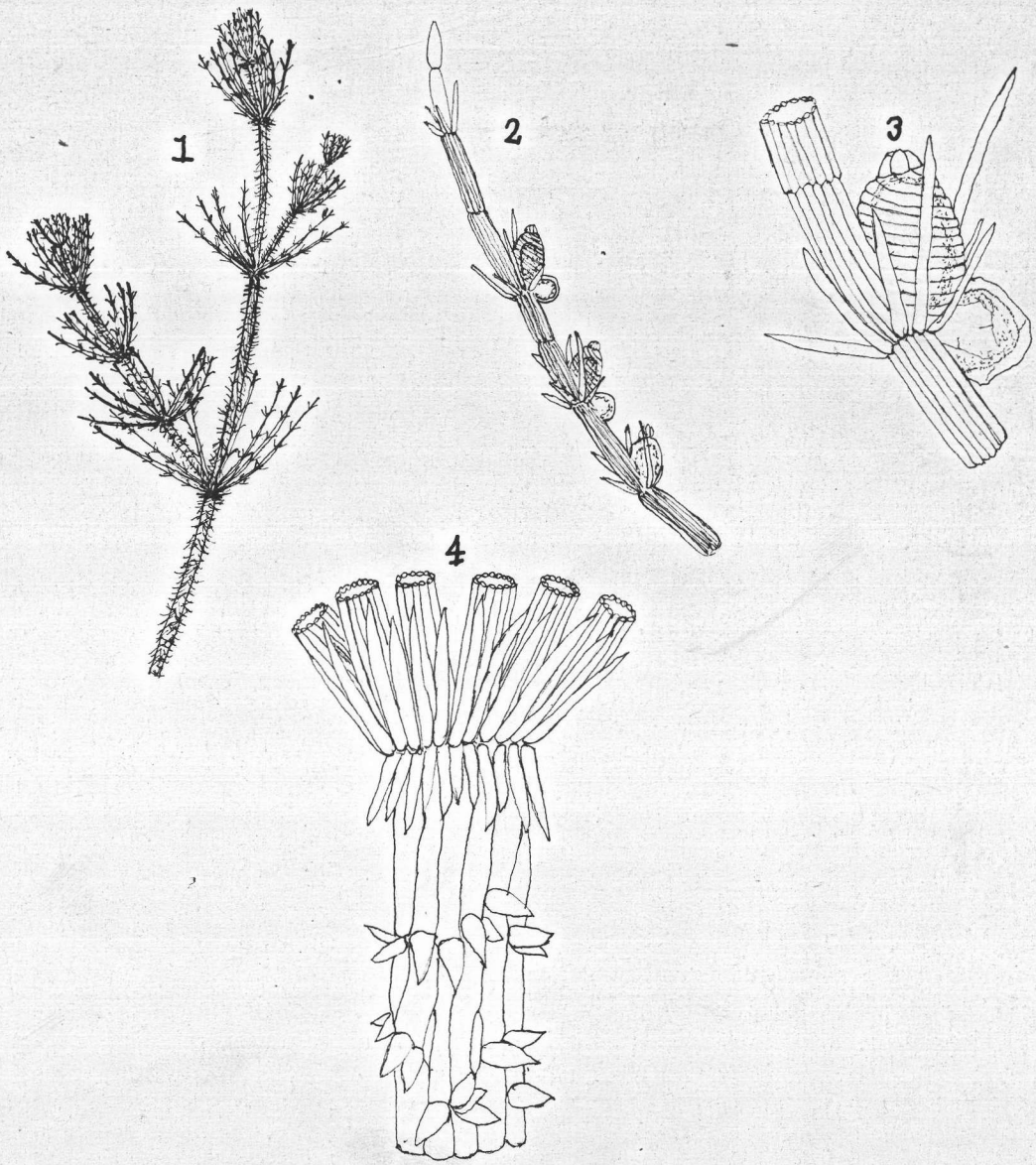
Figure 1. Chara canescens Desv. & Lois in Lois.

1. Habit X 2.

2. Branchlet with gametangium, bract-cells and end segment naked X 12.

3. Part of branchlet, showing conjoined gametangia and verticillate bract-cells, shorter bracteoles X 40.

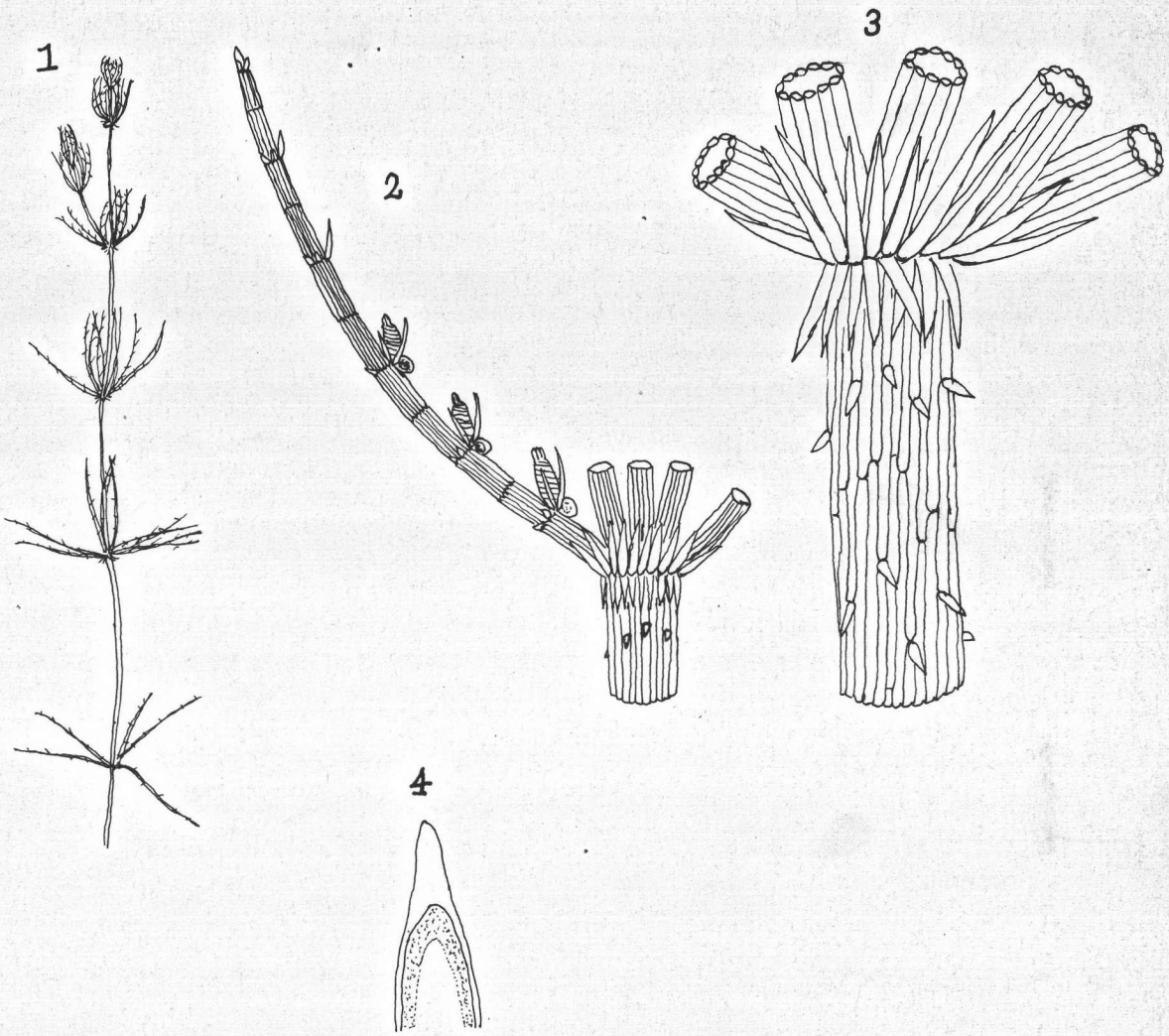
4. Part of young axial node with stipulodes in 2 tiers, 1-2 corticated cortex and geminate spine-cells X 40.



CHARA CANESCENS

Figure 2. Chara globularis Thuill., em.

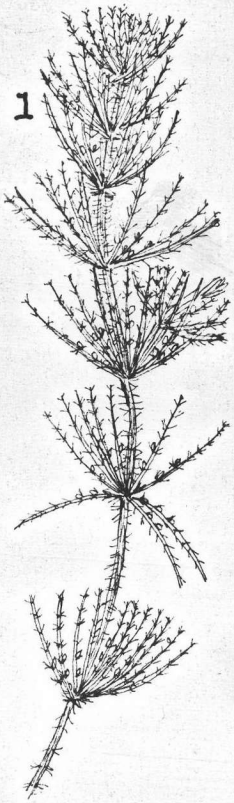
1. Habit X1.
2. Part of axial node with fertile branchlet, 2 corticate, conjoined gametangia and small bract-cells X 20.
3. Part of axial node with stipulodes in 2 tiers, 2 per branchlet, base of branchlets, 3 cortricated axial cortex, and solitary spine-cells X 20.
4. Apex of bract-cell X 60.

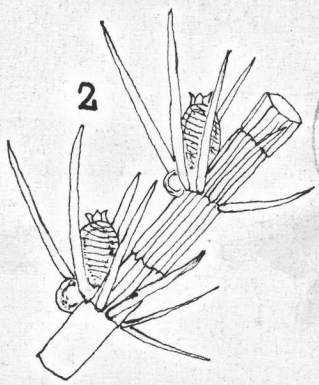


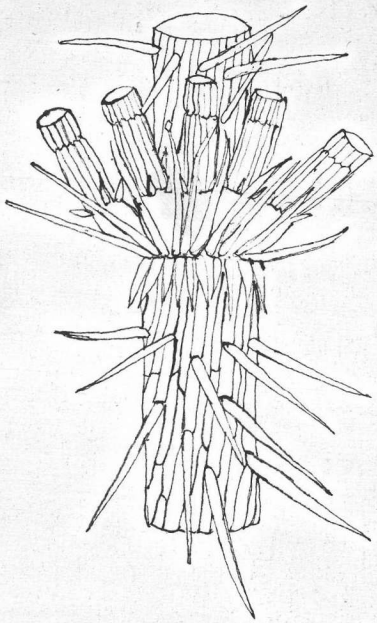
CHARA GLOBULARIS

Figure 3. Chara zeylanica Klein ex. Willd., em.

1. Habit X 1.
2. Basal part of branchlet, showing abbreviated ecorticated basal segment and succeeding, 2 corticated segments, conjoined gametangia X 20.
3. Part of axial node, well-developed diplostephanous stipulodes, basal part of branchlets, 3 corticated, axial cortex with long spine-cells X 20.
4. Apex of branchlet X 60.







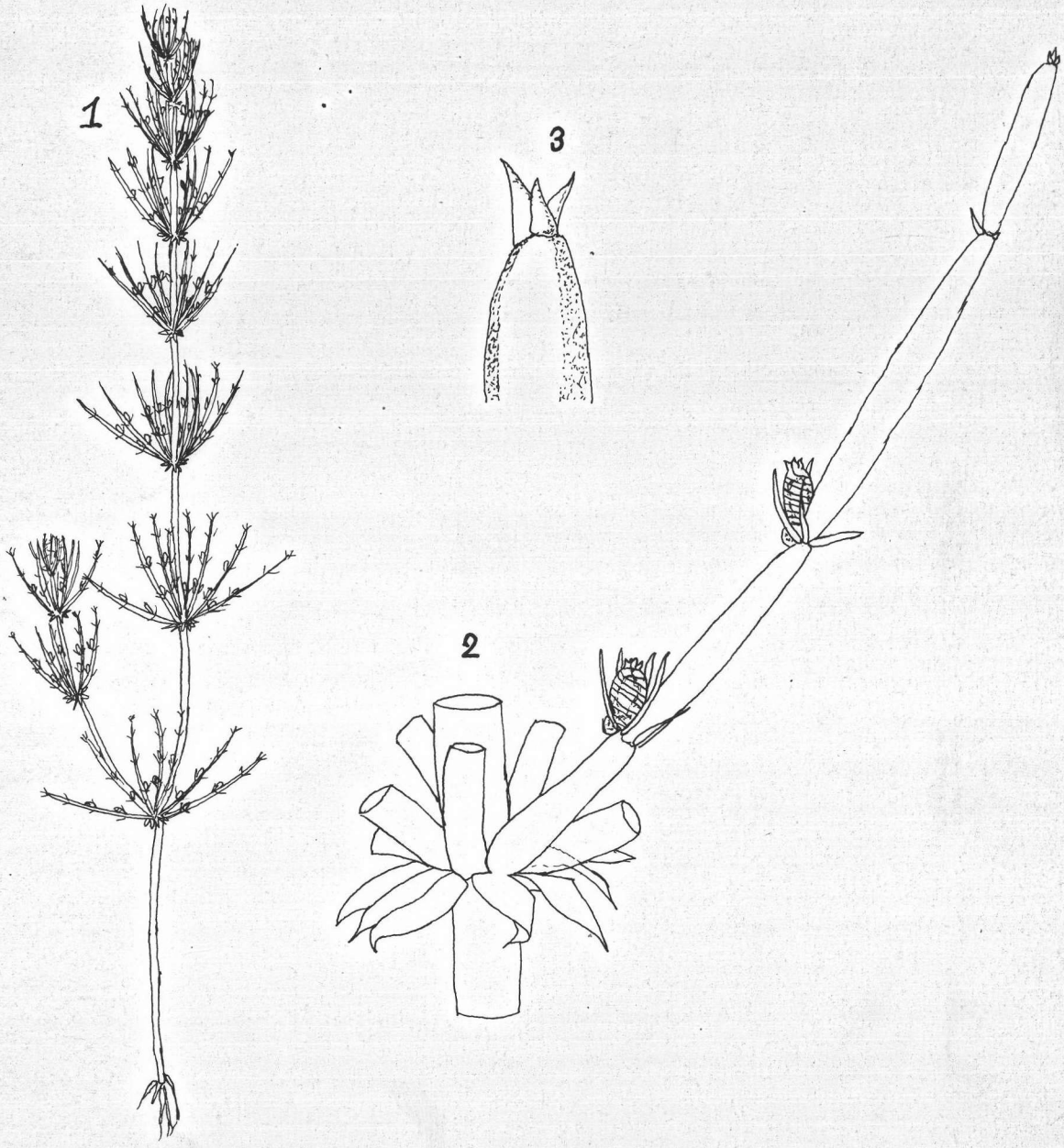
CHARA ZEYLANICA

Figure 4. Chara braunii Gm.

1. Habit X 1.

2. Part of axial node and fertile branchlet, showing stipulodes, and geminate conjoined gametangia X 12.

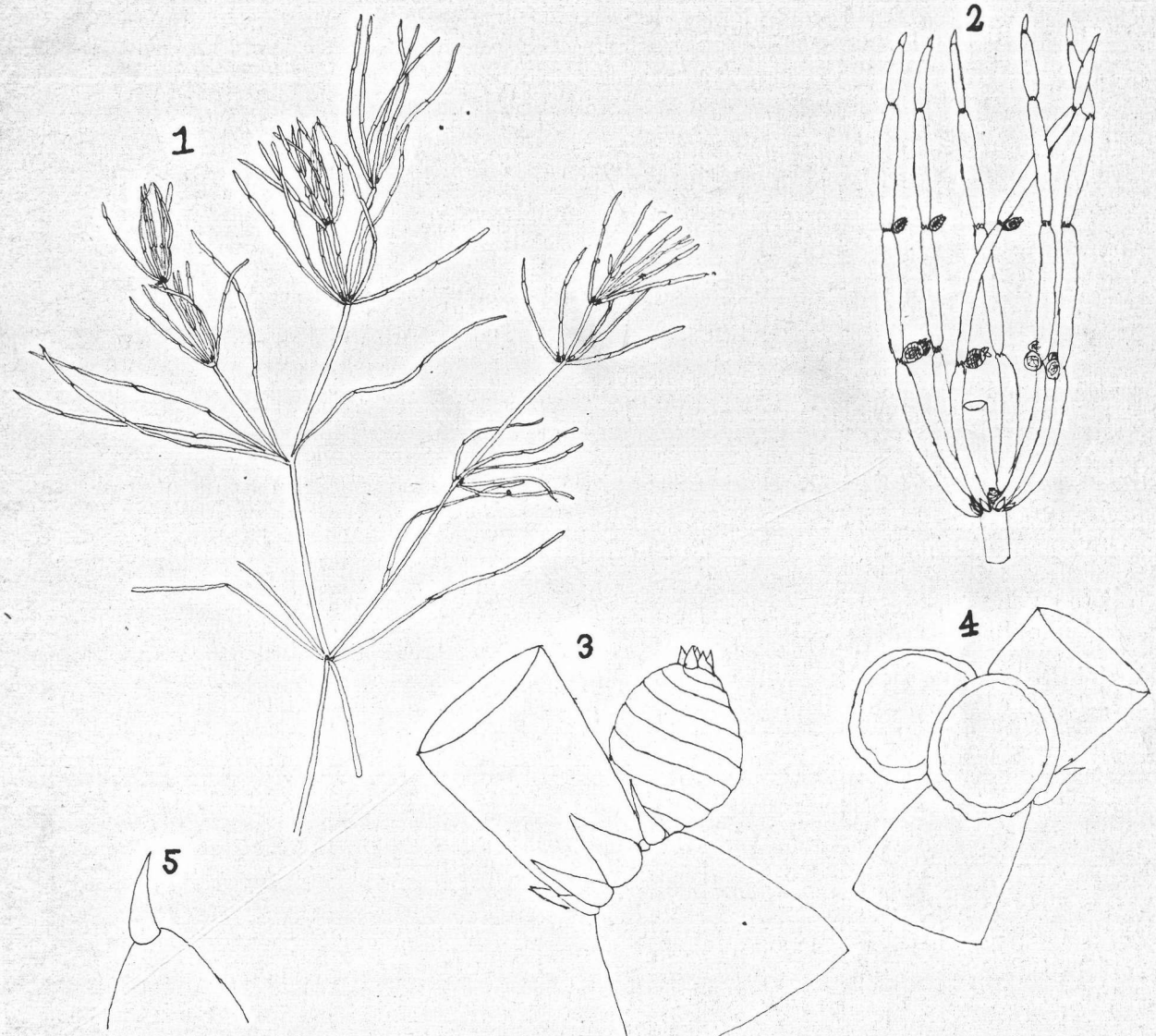
3. Apieces of branchlets showing terminal corona X 20.



CHARA BRAUNII

Figure 5. Chara corallina Klein ex. Willd., em.

1. Habit X 1.
2. Fertile branchlets, showing geminate sejoined gametangia X 5.
3. Branchlet node showing oogonium, bracteoles, and bractcells X 20.
4. Branchlet node showing geminate antheridia X 20.
5. Apex of branchlet X 20.



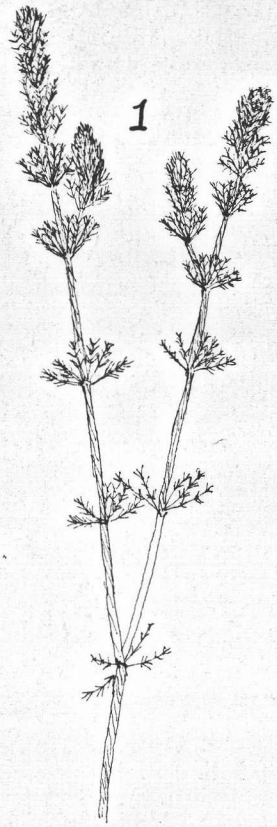
CHARA CORALLINA var CORALLINA

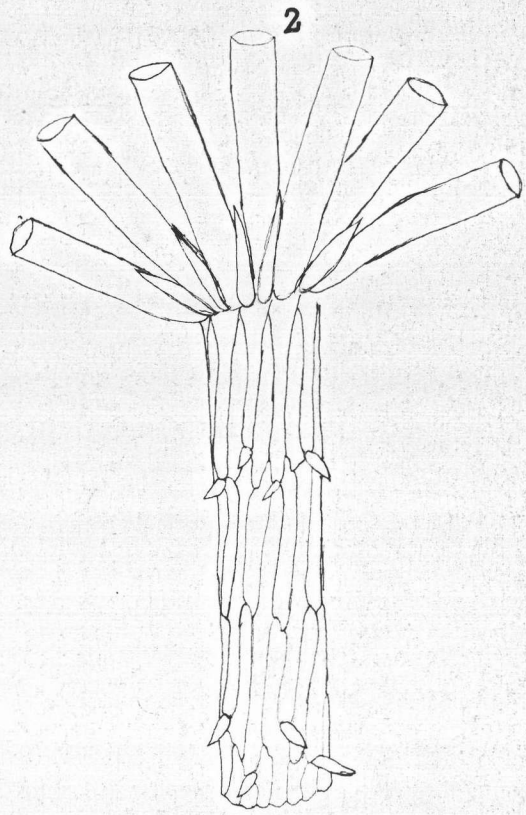
Figure 6. Chara fibrosa v. fibrosa Ag. ex. Bruz., em.

1. Habit X 1.

2. Axial node with stipulodes in 1 tier; alternate, 2 corticated. axial cortex, base of branchlet and solitary spine-cells X 20.

3. Branchlet with oogonium, bract-cells developed elongate X 6.

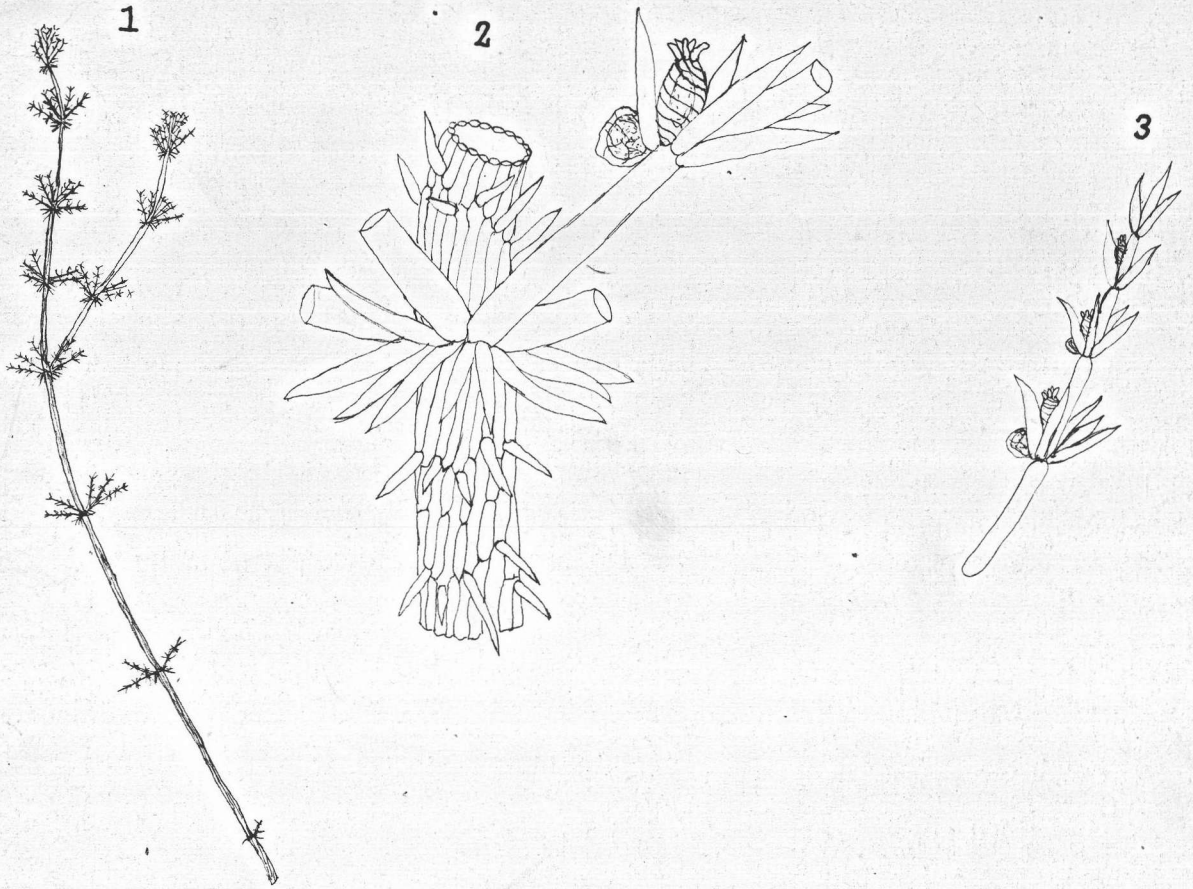




CHARA FIBROSA var FIBROSA

Figure 7. Chara fibrosa v. hookeri (A.Br.) R.D.W.

1. Habit X 1.
2. Axial node with stipulodes in 1 tier, 2 corticated axis, solitary spine-cell, and conjoined gametangia X 20.
3. Fertile branchlet showing conjoined gametangia and bract-cells X 12.



CHARA FIBROSA var HOOKERI

Figure 8. Chara ecklonii A.Br., ex. Kutz., em.

1. Habit X 1.

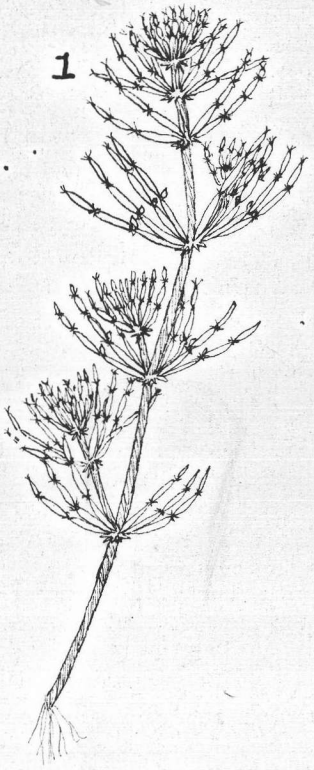
2. Portion of axial node with 2 node showing sterile branchlets and young axillary branch. X 8.

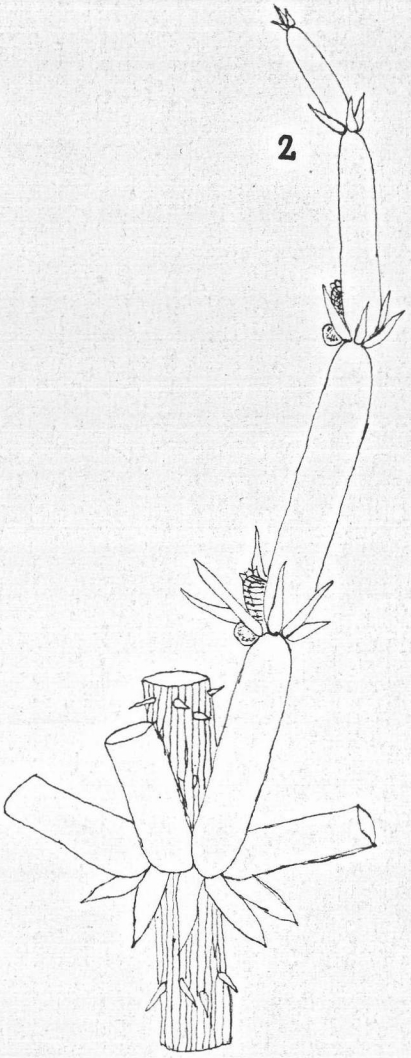
3. Fertile branchlet with conjoined gametangia X 5.

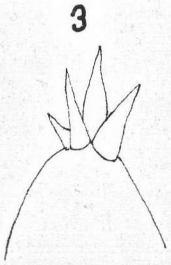
CHARA ECKLONII

Figure 9. Chara baueri A.Br., em.

1. Habit X 1.
2. Part of axial node with stipulodes in 1 tier, 3 corticated axis, and fertile branchlet with corona tip X 8.
3. Apex of branchlet shoeing corona consisting of end cell and subtending bract-cells X 40.







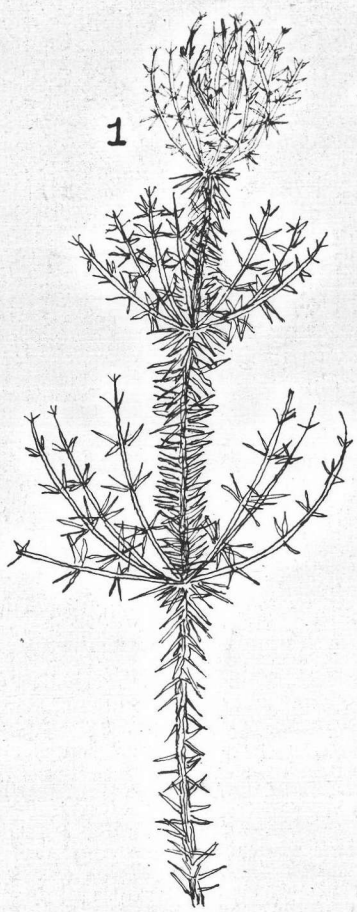
CHARA BAUERI

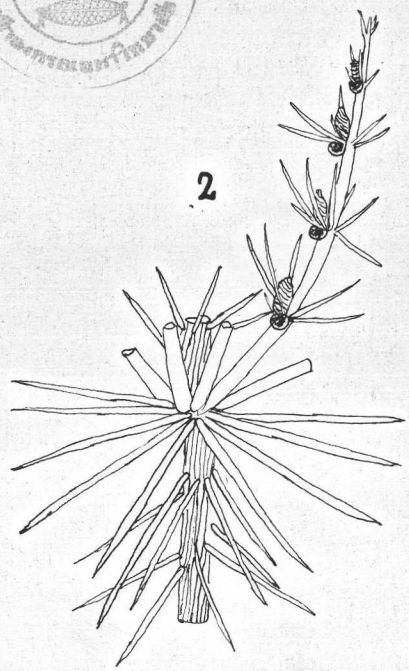
Figure 10. Chara hornemannii Wallm., em.

1. Habit X 1.

2. Axial node of fertile plant showing long stipulodes, spine-cells and oogonium above antheridium X 2.

3. Apex of bract-cell X 23.

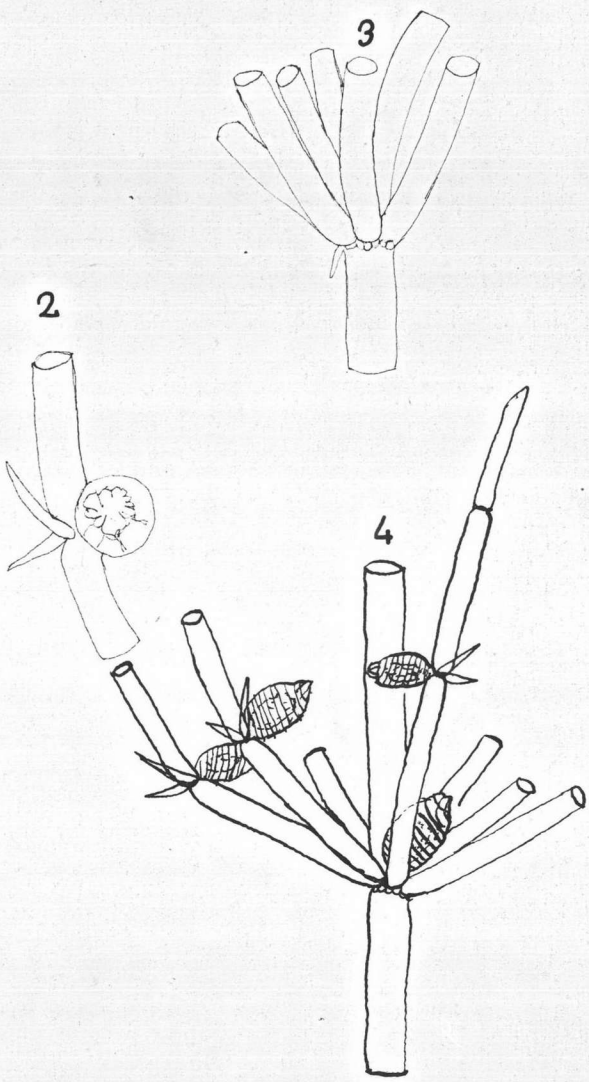




CHARA HORNEMANNII

Figure 11. Nitellopsis sarcularis Zanev.

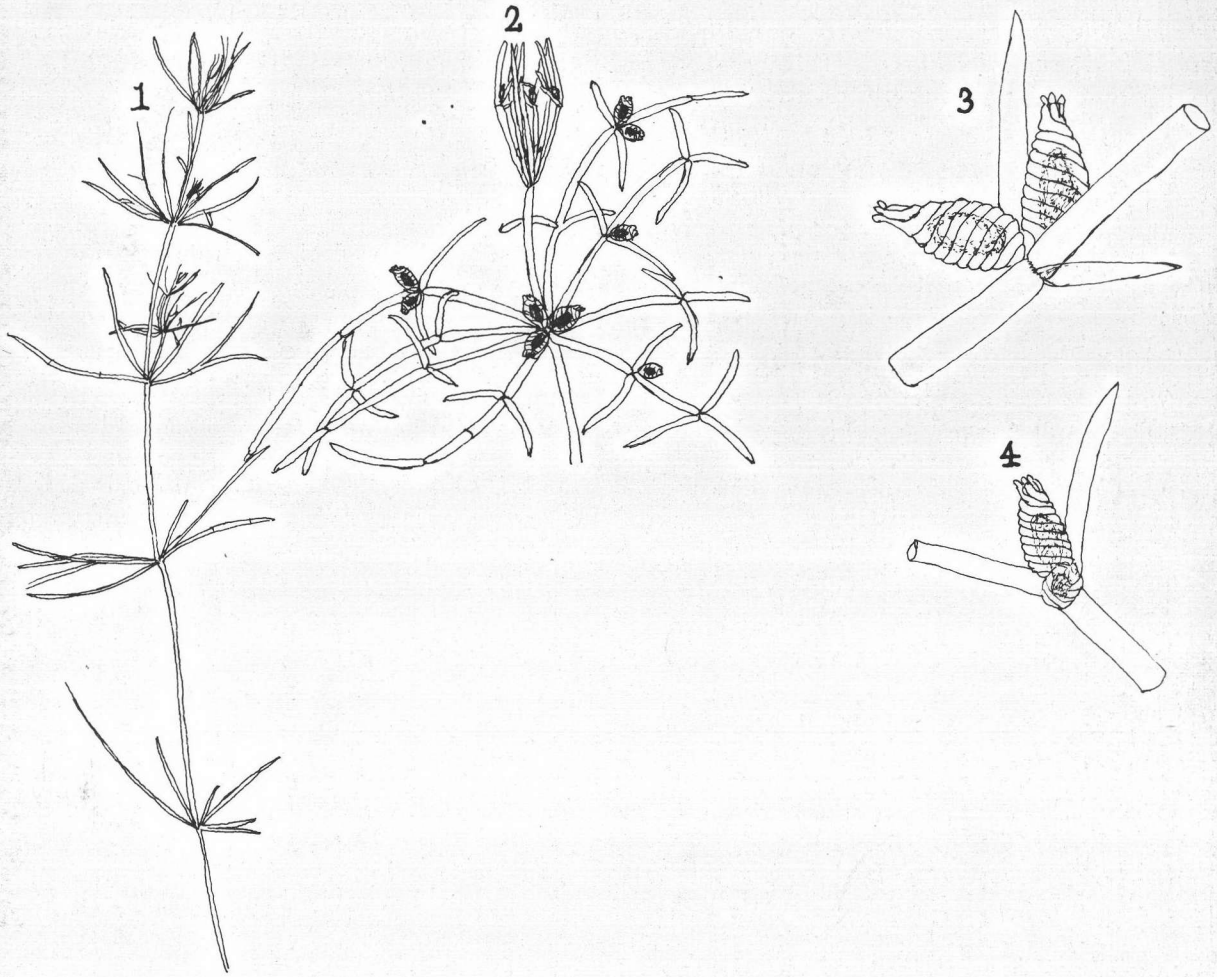
1. Habit X 2.
2. Branchlet node wiht antheridium X 20.
3. Axial node shoeing one well formed and several rudimentary stipulodes X 16.
4. Axial node with a part of female branchlet X 20.



NITELLOPSIS SARCULARIS

Figure 12. Nitellopsis bulbilifera C. Dont.

1. Habit X 1.
2. Upper portion of shoot showing geminate oogonia and the 1-2 inserted bract-cells X 3.
3. Adaxial view of geminate oogonia at branchlet node X 20.
4. Branchlet node with two longitudinally geminate oogonia X 20.



NITELLOPSIS BULBILIFERA

Figure 13. Nitella flexilis (L.) Ag.

1. Habit X 1.

2. Part of axial node showing fertile branchlet with sejoined gametangia X 12.

3. Apices of dactyls cells X 40.

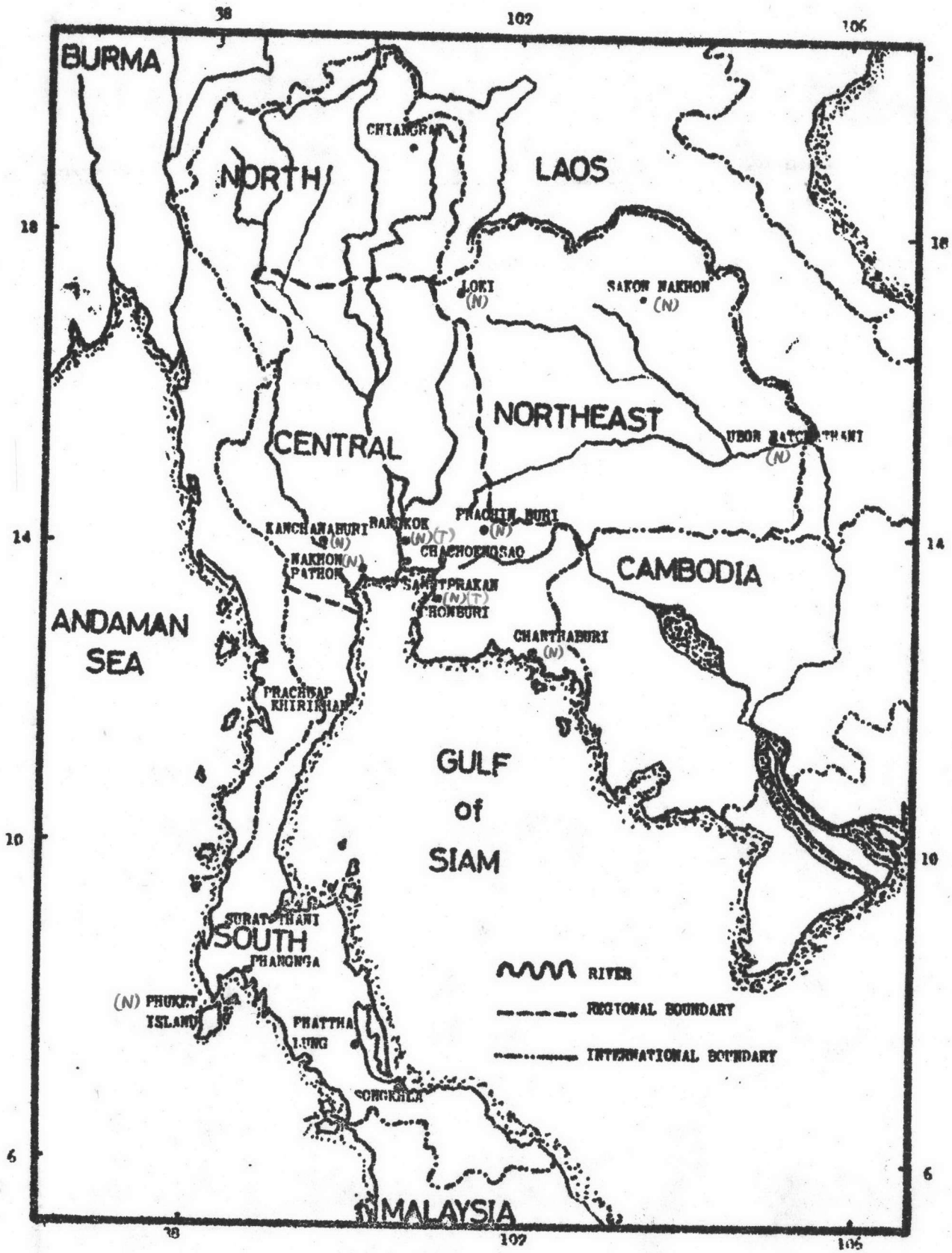
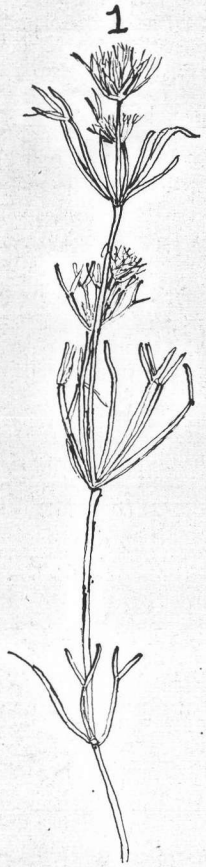
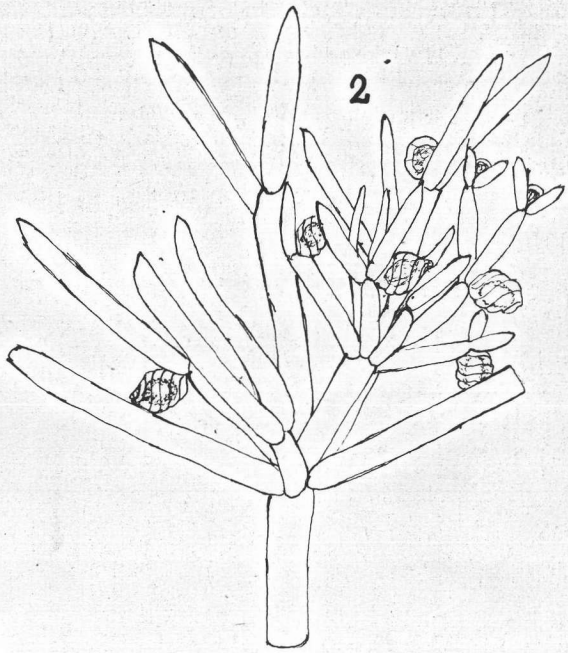
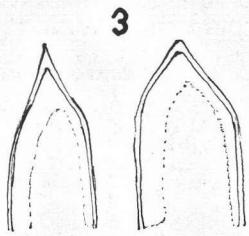

98
102
106
BURMA
NORTH
CHIANGRAI
LAOS
18
LOEI
(N)
SAKON NAKHON
(N)
NORTHEAST
CENTRAL
UBON RATCHATHANI
(N)
PRACHIN BURI
(N)
KANCHANABURI
(N)
BANGKOK
(N)(T)
CHACHOENGSAO
14
NAKHON
PATHOM
(N)
SAMUTPRAKAN
(N)(T)
RONBURI
CAMBODIA
ANDAMAN
SEA
CHANTHABURI
(N)
PRACHUAP
KHIRIKHAN
GULF
of
SIAM
10
SURAT THANI
SOUTH
PHANGNGA
(N) PHUKET
ISLAND
PHATTHA
LUNG
SONGKHLA
6
MALAYSIA
RIVER
REGIONAL BOUNDARY
INTERNATIONAL BOUNDARY

Figure 14. Nitella mirabilis Nordst. Ex J. Gr., em.

1. Habit X 1.
2. Axial node with 1-2 furcate branchlets X 4.
3. Female branchlet node showing aggregated, sessile oogonia X 20.
4. Apices of dactyls cell X 30.
5. Male branchlet node showing agregated sessile antheridia X 4.







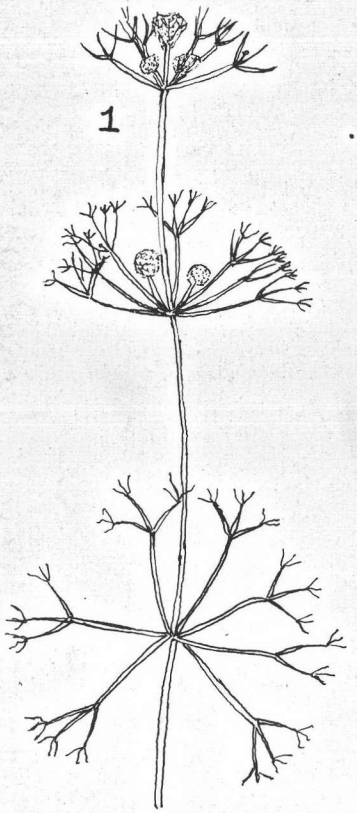
NITELLA FLEXILIS

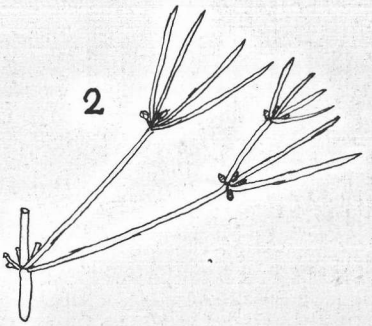
Figure 15. Nitella acuminata A.Br. em Wallm., em.

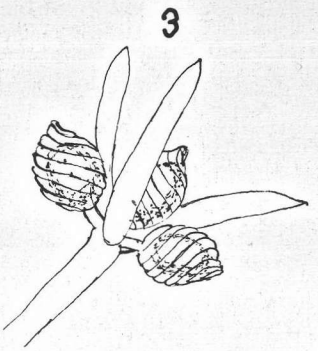
1. Habit X 1.

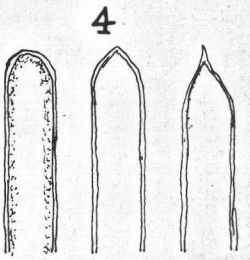
2. Axial node with 1 furcate branchlet, aggregrate oogonia X 40.

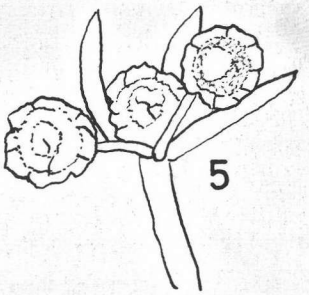
3. Apices of dactyls cells X 60.







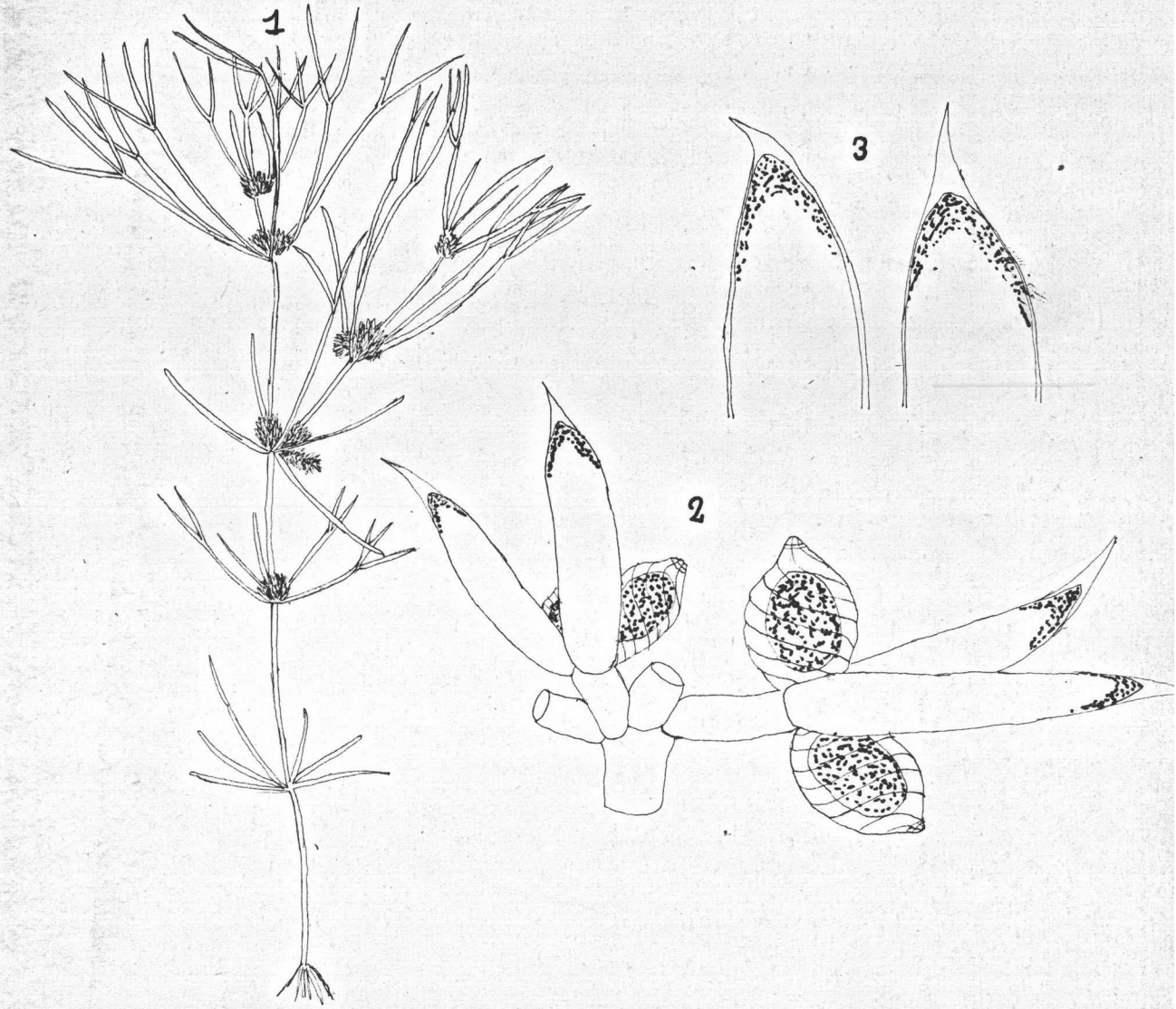




NITELLA MIRABILIS

Figure 16. Nitella stuartii A.Br.

1. Habit X 1.
2. Axial node with whorl of accessory fertile branchlets and a normal fertile branchlet X 12.
3. Branchlet node with conjoined gametangia X 30.
4. Apices of dactyl cell X 40.



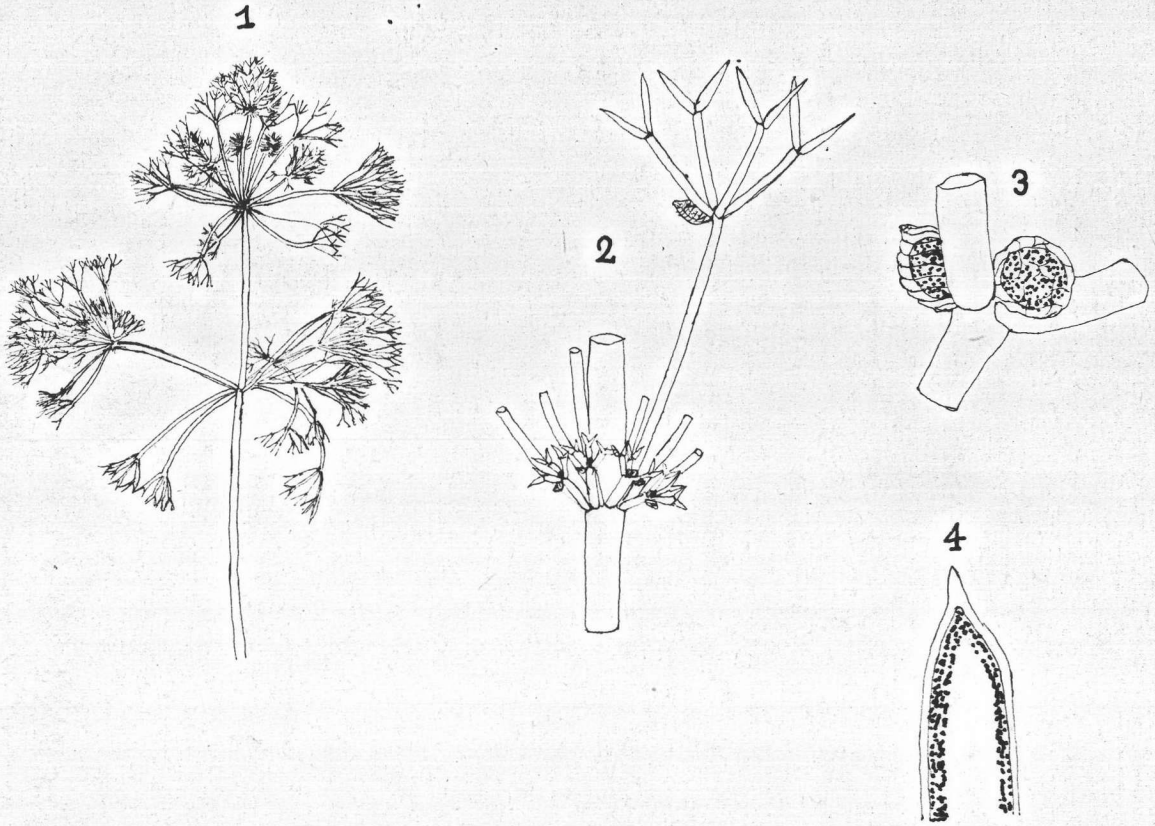
NITELLA ACUMINATA var. GREENII

Figure 17. Nitella allenii Imah., em.

1. Habit X 1.

2. Fertile branchlet, 1-2 furcate with aggregate gametangia X 30.

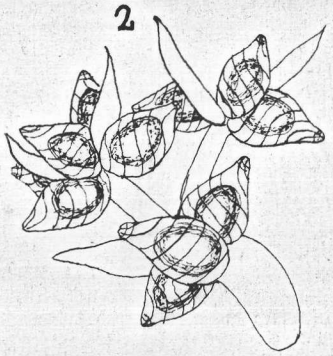
3. Apices of dactyl cells X 60.

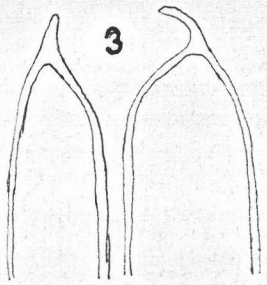


NITELLA STUARTII

Figure 18. Nitella hookeri A. Br.

1. Habit X 1.
2. Axial node with sterile branchlet X 6.
3. Axial node with fertile branchlet showing conjoined gametangia X 10.
4. Apices of dactyle cell X 30.

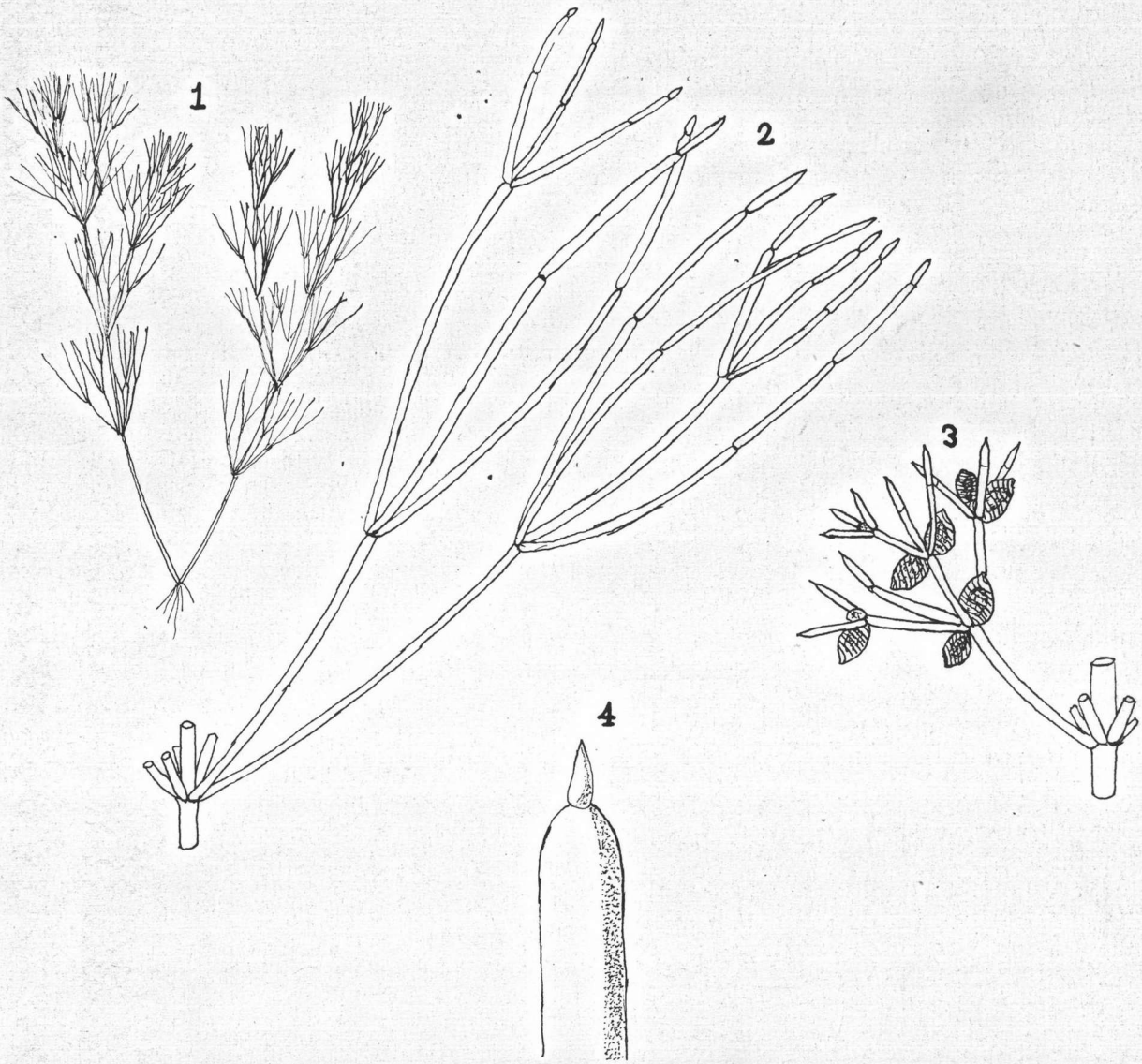




NITELLA ALLENII

Figure 19. Nitella dualis Nordst. in T.F.A.

1. Habit with mucus X 1.
2. Axial node with 2-3 furcate fertile branch with sejoined gametangia X 20.
3. Part of branchlet node showing geminate oogonium X 40.
4. End cells of dactyls of sterile branchlet X 60.

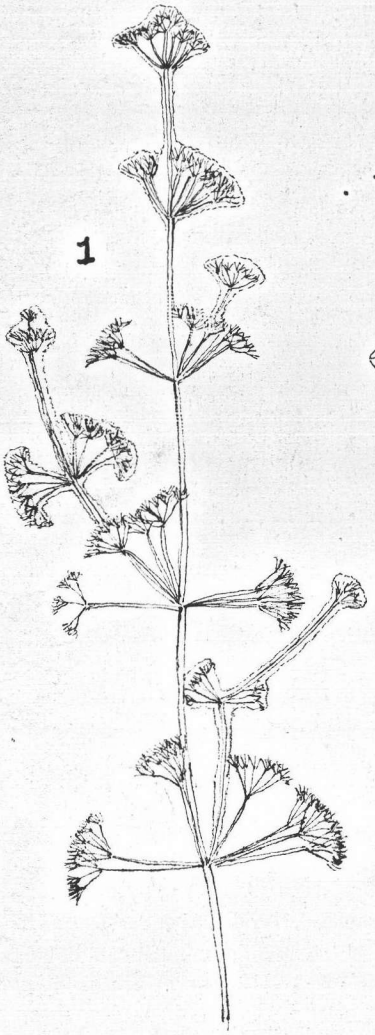


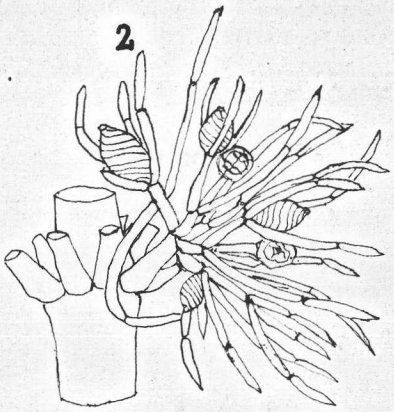
NITELLA HOOKERI

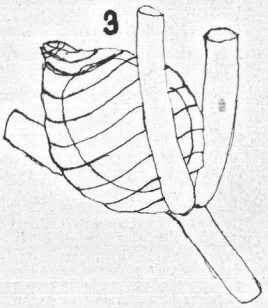
Figure 20. Nitella heteroteles J.Gr. & Steph.,

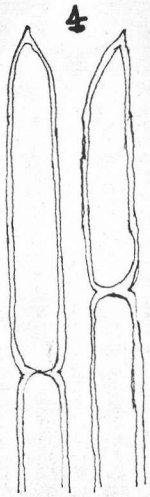
1. Habit X 1.

2. Sterile branchlet showing dactyle cells X 10.









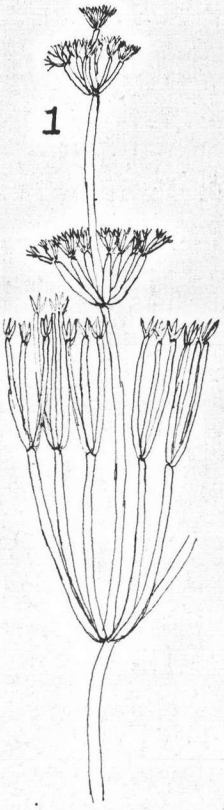
NITELLA DUALIS var. PULCHELLA

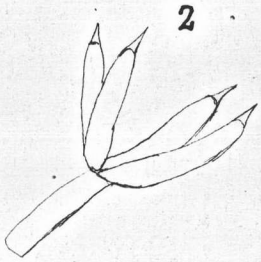
Figure 21. Nitella furcata Ag., em.

1. Habit X 1.

2. Axial node with 2-3 furcate fertile branchlet showing conjoined gametangia X 6.

3. Variation of apices of dactyle cells X 20.





NITELLA HETEROTELES

Figure 22. Nitella duthieae J.Gr. & Steph., sp. dub.

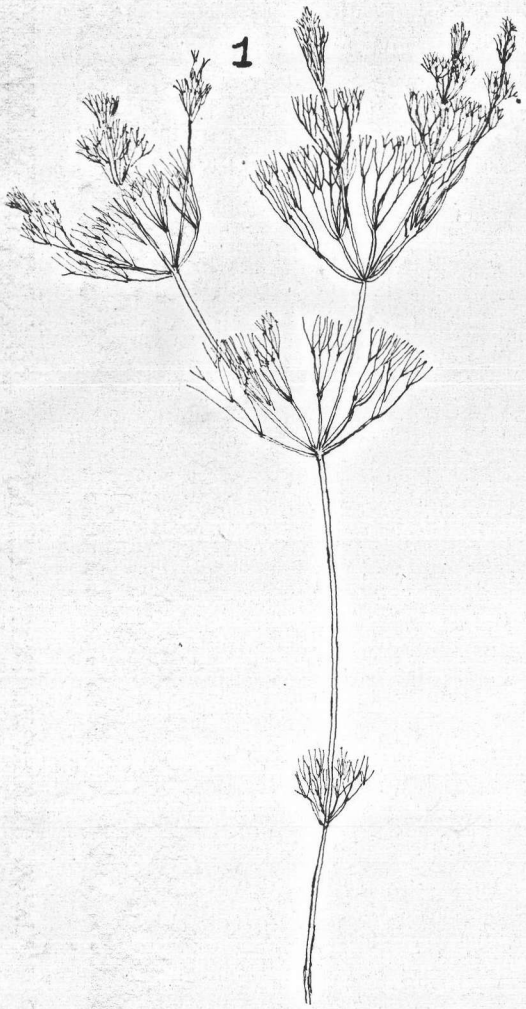
1. Habit X 1.

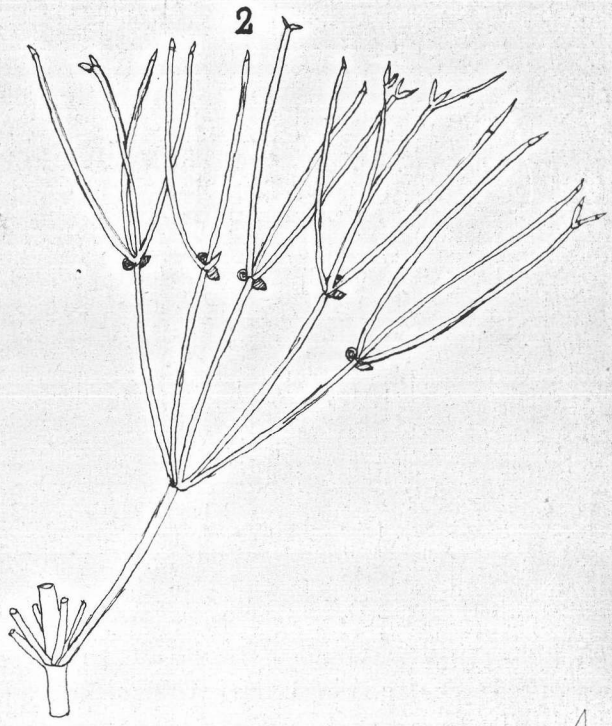
2. Axial node with fertile whorls X 2.

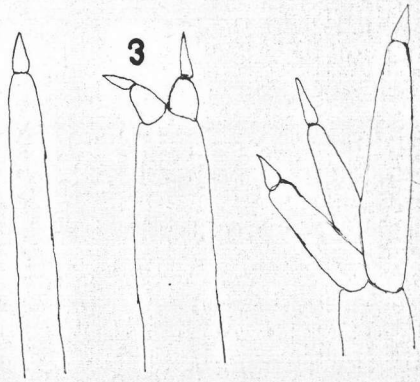
3. Fertile branchlet whorl as viewed from above X 6.

4. Apices of dactyle cell X 10.

5. Apex of branchlet showing corona of short end cell X 10.





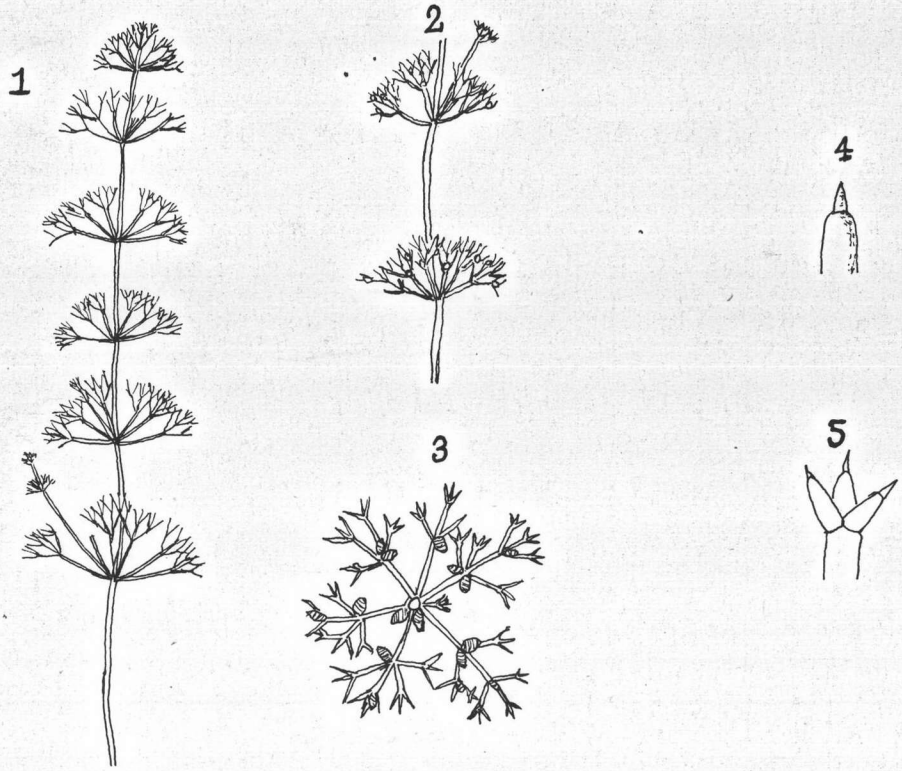


NITELLA FURCATA var. ORIENTALIS

Figure 23. Nitella penicillata A.Br., em.

1. Habit X 1.

2. Fertile branchlet with antheridia and mucus X 6.



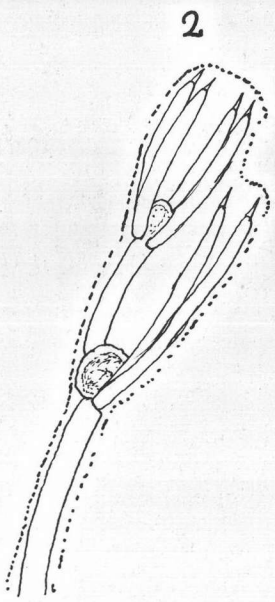
NITELLA DUTHIEAE

Figure 24. Nitella lhotzkyi A.Br., em.

1. Habit X 1.

2. Axial node showing whorls of normal branchlets and small accessory branchlets X 12.

3. Fertile branchlet showing 1-2 furcate X 20.



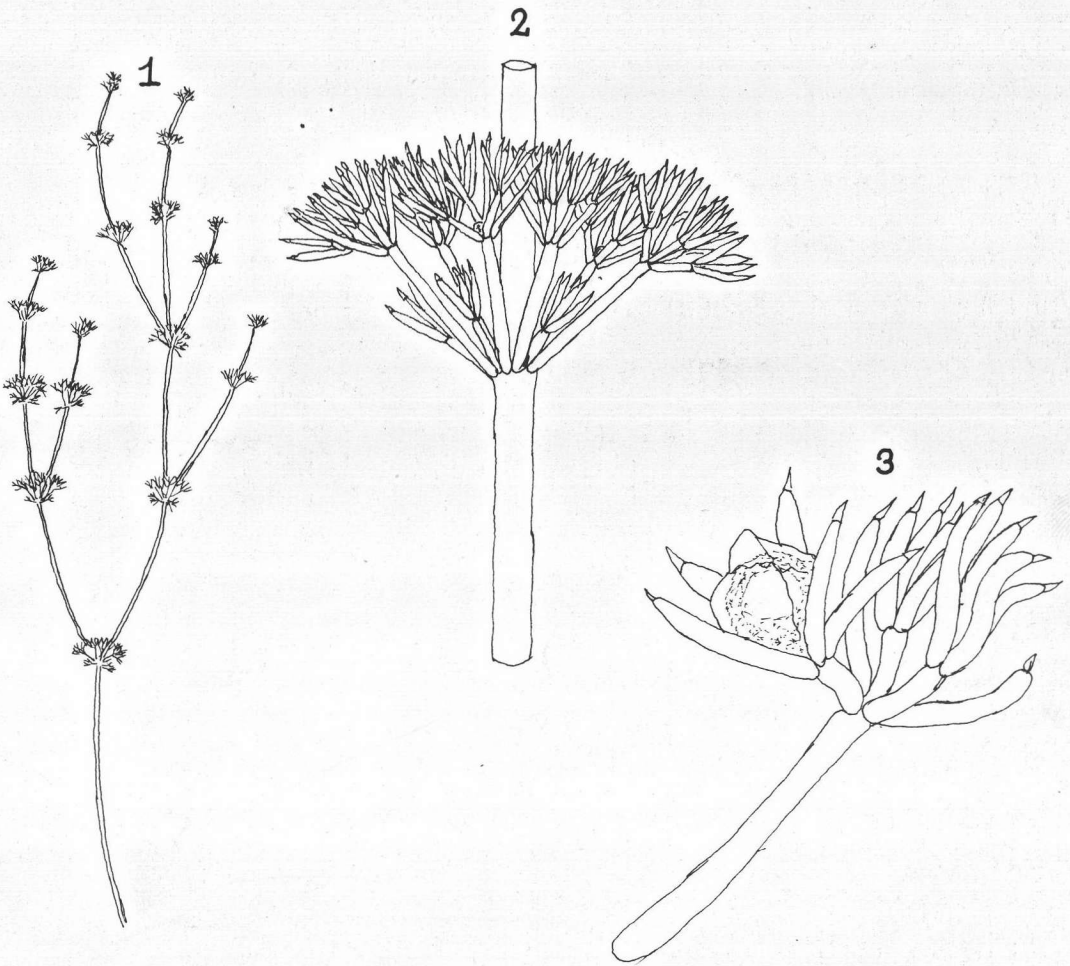
NITELLA PENICILLATA

Figure 25. Nitella translucens Ag., em.

1. Habit X 1.

2. Axial node of fertile head X 20.

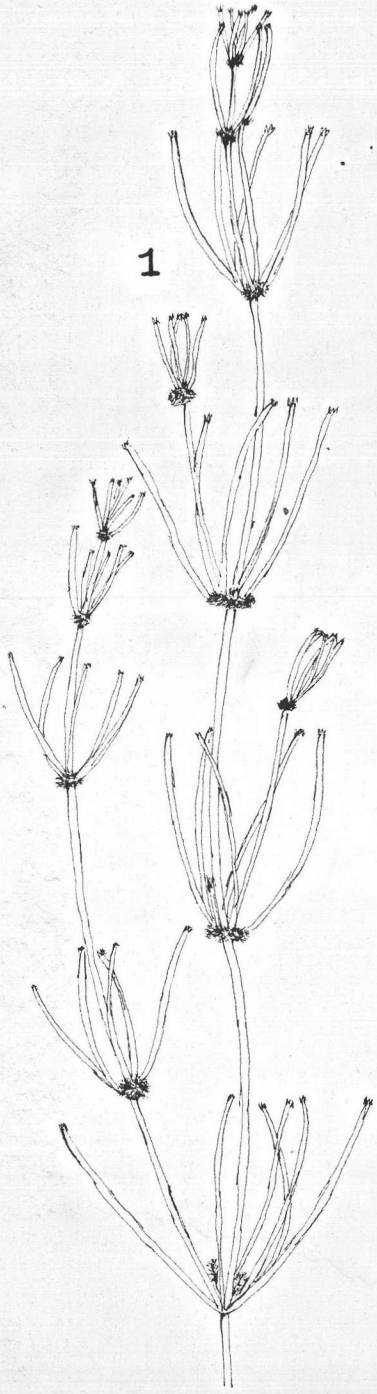
3. Apiece of sterile branchlets. X 40.

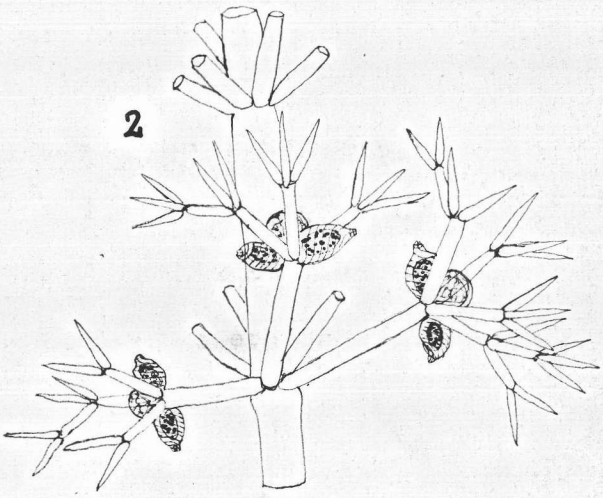


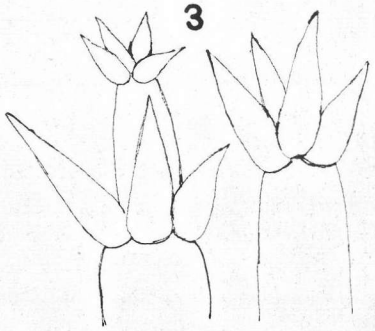
NITELLA LHOTZKYI

Figure 26. Tolypella intricata Leonh., em.

1. Habit X 1.
2. Axial node of fertile head showing conjoined gametangia X 40.
3. Apices of dactyle cell X 40.





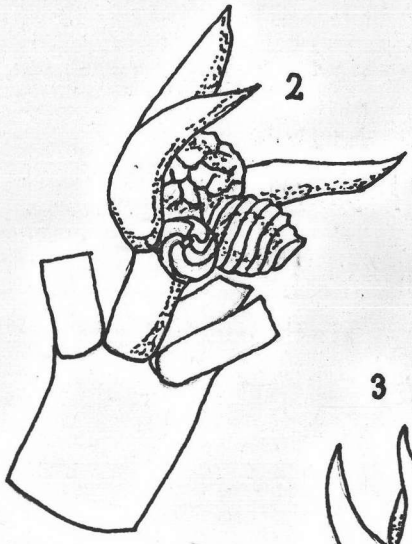


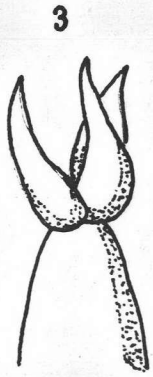
NITELLA TRANSLUCENS

Fig. 27. The distribution of genus Chara and genus Nitellopsis in Thailand

(C) = genus Chara

(Ni)= genus Nitellopsis



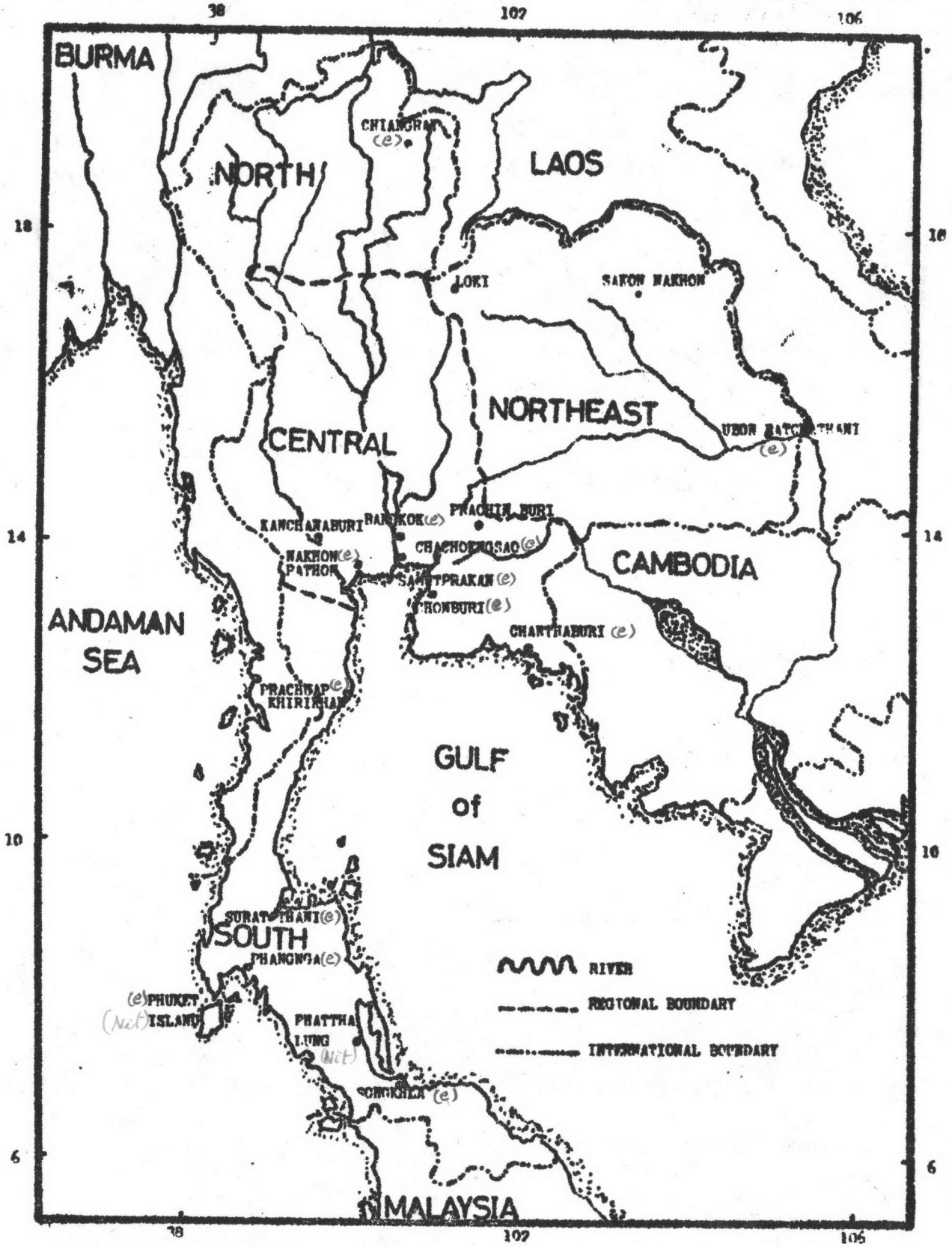


TOLYPELLA INTRICATA

Fig. 28. The distribution of genus Nitella and genus Tolypella in Thailand

(N) = genus Nitella

(T) = genus Tolypella


98
102
106
BURMA
NORTH
CHIANGRAI (e)
LAOS
18
LOEI
SAKON NAKHON
NORTHEAST
CENTRAL
UBON RATCHATHANI (e)
KANCHANABURI
BANGKOK (e)
PHACHIN BURI
14
NAKHON PATHOM (e)
CHACHOENGSAO (e)
SAMUTPRAKAN (e)
CAMBODIA
THONBURI (e)
ANDAMAN SEA
CHANTHABURI (e)
PRACHUAP KHIRIKHAN (e)
GULF of SIAM
10
SURAT THANI (e)
SOUTH
PHANGNGA (e)
(e) PHUKET ISLAND
PHATTHALUNG (e)
SONGKHLA (e)
RIVER
REGIONAL BOUNDARY
INTERNATIONAL BOUNDARY
6
MALAYSIA
98
102
106

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TECHNICAL TERMS.

Acuminate	= apex tapering sharp.
Acute	= apex tapering.
Allantoid	= apex rounded.
Anarthrodactylous	= dactyle 1 cell.
Apiculate	= apex rounded with minute tapering point.
Arthrodactylous	= dactyle 2 or more cell (bicellulate).
Attenuate	= cell reduced distally, end cell round.
Aulacanthous	= spine globose.
Bicellulate	= dactyle 2 cells.
Bistipulate	= stipuloides 2 per branchlet.
Brachydactylous	= dactyle reduce, tiny.
Bract cell	= spine cell at the node of branchlet.
Bracteole	= spine cell beside the sex organ.
Branchlet	= limited branch.
Conjoined	= male and female sex organ on the same node.
Corona	= terminal cells of branchlet arrange into crown shape.
Coronula	= terminal cells of oogonium.
Corticate	= with cortex.
Dactyle cell	= the last cell of branchlet.
Diaphanous	= cortex of basal segment discolored.
Dimorphic	= 2 kind of branchlet.
Diplostephanous	= stipuloides 2 tiers.
Diplostichous	= 2 cortication, spine cell 1 per 2 corticate cells.

Ecorticate	= without cortex.
Fasciculate	= 2-3 spine cells on the same point.
Furcate	= branch divided.
Globule (antheridium)	= male sex organ.
Gymnophyllus	= branchlets totally ecorticate.
Gymnopodous	= 2-3 cortication, spine cell not born on every corticate cell.
Haplostephanous	= stipulodes 1 tier.
Haplostichous	= spine cell on every corticate cell.
Heteroclemous	= dimorphic at the same node.
Homoclemous	= monomorphic, branchlet 1 kind.
Isostichous	= corticate cell 1 kind.
Lateral branch	= unlimited branch.
Mucronate	= end cell minute, base smaller than penultimate cell.
Nucule (oogonium)	= female sex organ.
Penultimate cell	= cell base of dactyle cell.
Phloeopodous	= spine cell on every corticate cell.
Pluricellulate dactyle	= dactyle more than 1 cell.
Sejoined	= male and female sex organs on seperate node.
Sessile	= gametangium without stalk.
Stipitate	= gametangium with stalk.
Stipulodes	= spine cell at the axial node.
Terete	= round.
Triplostichous	= 3 cortication,1 spine cell per 3 corticate.
Tylacanthous	= spine cell fasciculate.
Unistipulate	= stipulodes 1 per branchlet.