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Source: *Journal of Paleontology*, Vol. 33, No. 1 (Jan., 1959), pp. 186-194

Published by: SEPM Society for Sedimentary Geology

Stable URL: <https://www.jstor.org/stable/1300822>

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GAMETANGIAL CONSTANTS OF EXTANT CHAROPHYTA FOR USE IN MICROPALAEOBOTANY*

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ABSTRACT—Descriptive data on extant species of Charophytes have been compiled, and from them are presented four tables for use in identifying fossils. In the tables, the species are arranged by increasing quantitative value of (1) maximum oogonium length, (2) maximum number of oogonial convolutions, (3) maximum oospore length, and (4) maximum number of oospore striae. They are intended to assist workers in reducing the number of possibilities in specific determinations to a relatively small number, thus reducing the burden of identification. The tables should be useful to micropaleobotanists and phycologists alike.

INTRODUCTION

IDENTIFICATION of fossil Charophyta of the modern type requires checking whether or not they belong to extant species. Since there are over 300 species currently recognized this is not easy. In order to develop a method by which workers could eliminate all but the most likely possibilities, the writer prepared a series of four tables containing gametangial characters of extant Characeae arranged in order of increasing quantitative values. Included are length of oogonium (or limeshell), number of convolutions of oogonium, length of oospore, and number of striae of oospore. The species included are those accepted by Wood (1952) augmented from Imahori (1954). See the former for a useful and concise listing. The data were taken from hand-sort punched cards containing species descriptions, by the method described earlier (Wood, 1957).

The data contained in the tables were originally extracted from the foremost taxonomic references. The majority of values were taken from the works of Braun (1867), Braun & Nordstedt (1882), Migula (1890, 1904, 1930), Robinson (1906), Groves & Bullock-Webster (1920, 1924), Zaneveld (1940), Wood (1948), Daily (1953), Imahori (1954), and Allen (1954). Data on new and unique species were gleaned from the many works of specialists such as Corillion, Filarszky, Hy, and Vilhelm. For more complete list of references, see the works of

Wood (1952), Imahori (1954), and Groves & Bullock-Webster (1924).

Certain difficulties are inherent in the sources of information, and compromises are necessary in organizing the figures.—Oogonium length: Descriptions occasionally fail to specify whether the coronula was included in the measurement. An endeavor was made to determine the practice of each writer; however, where doubt remained, the uncertainty was indicated by "?." Where it is thought that the coronula was included, its length has been subtracted. When the size of the coronula was not known, an arbitrary 25μ was subtracted from the oogonium lengths of Nitelleae, and 50μ from those of the tribe Chareae.—Disagreements among available data: Where two foremost authors give somewhat different values, the combined range is used.—Data from illustrations: Where descriptions lack certain measurements, but where good plates are available, measurements have been taken from the figures.—Absence of data: Where no information is available, the species name is listed alphabetically at the end of the table.

Difficulties in arranging overlapping values were resolved by the following policy. Species were arranged in order of the maximum value of the feature. Within a group having the same maximum values, the ones with greatest range of variation were listed first, followed by those of lesser range.

Difficulties in taxonomy of extant Characeae require that the tables be used with certain reservations. No modern monograph covers all charophytes of the world. The most recent attempt is that by Braun and Nordstedt (1882). Subsequent studies

* Supported in part by the Research Fund of the College of Arts and Sciences of the University of Rhode Island; and in part by a grant G 2517 of the National Science Foundation, 1956-57.

TABLE 1.—EXTANT CHARACEAE IN ORDER OF INCREASING MAXIMUM OOGONIUM LENGTH

Length excludes coronula. Where reference author included coronula, its length has been subtracted; whereas, “?” indicates cases where that author's intent is uncertain.

Length (microns)	Species	Length (microns)	Species
220-190	<i>Nitella capillata</i>	2470-400	<i>Tolypella intricata</i>
220-190	<i>N. moniliformis</i>	470-435	<i>Nitella spinosa</i>
?240	<i>N. guineensis</i>	475-355	<i>N. flagelliformis</i>
245-225	<i>N. allenii</i>	?475-450	<i>Tolypella giennensis</i>
265-230	<i>N. lecheri</i>	477-247	<i>Nitella acuminata</i>
275-175	<i>Tolypella coutinhoi</i>	?480	<i>N. axillocarpa</i>
?276	<i>Nitella suspicata</i>	?485-430	<i>N. translucens</i>
280-240	<i>N. gracillima</i>	490-410	<i>N. robusta</i>
?284-257	<i>N. transilis</i>	490-460	<i>N. spiciformis</i>
286-258	<i>N. pseudotenuissima</i>	500-290	<i>N. tumulosa</i>
300-267	<i>N. bonaërens</i>	500-375	<i>N. struthioptila</i>
?300	<i>N. habrocoma</i>	500-425	<i>N. divaricata</i>
310-225	<i>N. arechavaletae</i>	500-425	<i>Tolypella nidifica</i>
?325-275	<i>N. superba</i>	500-450	<i>Nitella vermiculata</i>
?325-285	<i>N. axillaris</i>	500	<i>N. blowiana</i>
325-285	<i>N. subluens</i>	?500	<i>N. gracilis</i>
325	<i>N. globulifera</i>	500	<i>N. heteroteles</i>
327-227	<i>N. uruguayensis</i>	505-405	<i>N. multipartita</i>
?340	<i>N. plumosa</i>	?505	<i>N. baronii</i>
?350-330	<i>Chara morongii</i>	510-450	<i>N. saitoana</i>
351-265	<i>Nitella morongii</i>	?510-450	<i>Tolypella prolifera</i>
355-316	<i>N. alleninda</i>	510-460	<i>Nitella tanakiana</i>
360-336	<i>Tolypella gracilis</i>	?513	<i>N. hyalina</i>
?365	<i>Nitella leibergii</i>	?515-415	<i>N. capitulifera</i>
370	<i>N. tenuissima</i>	515-415	<i>N. crispa</i>
375-350	<i>N. duthieae</i>	515-415	<i>N. dimorpha</i>
375-350	<i>N. grovesii</i>	515-465	<i>N. stricta</i>
390-350	<i>N. stabilis</i>	515-485	<i>N. tuyamae</i>
395-335	<i>N. capitellata</i>	?520-450	<i>Chara curtissii</i>
400-340	<i>N. sumatrana</i>	525-425	<i>Tolypella palhinhae</i>
400-370	<i>N. axilliformis</i>	?525-450	<i>Nitella dixonii</i>
405-335	<i>N. expansa</i>	?530-354	<i>N. oligospora</i>
?405-380	<i>N. praeclara</i>	530-430	<i>N. shinii</i>
?405	<i>N. tumida</i>	?530-480	<i>Chara abnormiformis</i>
410-355	<i>N. erecta</i>	?530	<i>C. longifolia(?)</i>
?415	<i>N. dictyosperma</i>	?535-525	<i>Nitella remota</i>
420-370	<i>N. phauloteles</i>	?540-505	<i>N. mucronata</i>
420-400	<i>N. bengalensis</i>	?541	<i>Chara keukensis</i>
?425-375	<i>N. ornithopoda</i>	545	<i>C. inermis</i>
425-405	<i>N. gracilens</i>	?550-320	<i>C. sibirica</i>
425	<i>N. ogivalis</i>	550-450	<i>Nitella japonica</i>
?430-330	<i>N. coreana</i>	550-475	<i>N. sphaerocephala</i>
?433-383	<i>Chara hatei</i>	?550-500	<i>Chara mollusca</i>
435-355	<i>Nitella lhotzkyi</i>	550-500	<i>Nitella pusilla</i>
?435-360	<i>N. confervacea</i>	?550-520	<i>Chara coronatiformis</i>
435-385	<i>N. inaequalis</i>	?550-525	<i>Nitella capillaris</i>
435-410	<i>N. madagascariensis</i>	?555-475	<i>N. syncarpa</i>
?440-416	<i>Chara pelosiana</i>	?555-485	<i>Chara conimbrigenis</i>
445-373	<i>Nitella bipartita</i>	?560-440	<i>C. cubensis</i>
450-220	<i>N. microcarpa</i>	560-460	<i>Nitella flagellifera</i>
?450-400	<i>N. doidgeae</i>	560	<i>Chara erythrogyna</i>
450-410	<i>N. oligogyra</i>	?560	<i>C. hypnoides</i>
450-420	<i>N. inversa</i>	560	<i>Nitella sejuncta</i>
?460-400	<i>N. musasiensis</i>	565-465	<i>N. rigida</i>
460-410	<i>N. graciliformis</i>	?570-530	<i>Chara schaffneri</i>
460-410	<i>N. pulchella</i>	?575-555	<i>Tolypella longicoma</i>
?465-395	<i>Tolypella glomerata</i>	?580-480	<i>Nitella morioakae</i>
470-400	<i>Nitella horikawae</i>	580-535	<i>N. tuberculata</i>

TABLE 1.—(Continued)

Length (microns)	Species	Length (microns)	Species
?600	<i>Chara fischeri</i>	?790-740	<i>Nitella spanioclema</i>
?610-600	<i>C. pistianensis</i>	?790-660	<i>Chara palmeri</i>
610	<i>C. succincta</i>	800-525	<i>C. vulgaris</i>
?615-525	<i>C. pashanii</i>	800-600	<i>C. aspera</i>
?620-540	<i>C. infirma</i>	800-700	<i>C. muscosa</i>
625-576	<i>Nitella conifera</i>	810-530	<i>C. contraria</i>
?645-375	<i>Chara rusbyana</i>	?810-610	<i>C. papillosa</i>
650-440	<i>C. gymnopitys</i>	?810-770	<i>C. leicpitys</i>
?650-500	<i>C. tenuispina</i>	?820-640	<i>C. bohemia</i>
?650	<i>C. baueri</i>	?840-730	<i>C. filicaulis</i>
655-255	<i>Nitella furcata</i>	850-550	<i>C. canescens</i>
655-555	<i>N. fallosa</i>	?850-650	<i>C. strigosa</i>
660-640	<i>Chara arcuatoifolia</i>	?850-770	<i>C. brittonii</i>
?657	<i>Tolypella comosa</i>	?850-800	<i>Lamprothamnium toletanus</i>
?670-550	<i>Chara altaica</i>	?850	<i>Chara socotrens</i>
?670-650	<i>C. leptosperma</i>	855-665	<i>C. zeylanica</i>
?670	<i>C. braunii</i>	?860-585	<i>Nitella flexilis</i>
?670	<i>C. tanyglochis</i>	?860-660	<i>Chara sanctae-margaritae</i>
?675-425	<i>C. arrudensis</i>	860-700	<i>C. wallichii</i>
?675-625	<i>Nitella opaca</i>	?860-820	<i>C. formosa</i>
?680-595	<i>Chara brachypus</i>	?865-685	<i>Protochara australis</i>
?685-625	<i>Tolypella apiculata</i>	?880-580	<i>Chara pallida</i>
685	<i>Nitella megacarpa</i>	?880	<i>C. globata</i>
700-300	<i>Chara hydrophytis</i>	900-790	<i>C. concinna</i>
?700-500	<i>Nitella knightiae</i>	900	<i>C. fulgens</i>
700-600	<i>Chara chrysospora</i>	910-730	<i>C. australis</i>
700-600	<i>C. pseudo-brachypus</i>	?910-750	<i>C. hirsuta</i>
700-660	<i>Nitella monodactyla</i>	?910-810	<i>C. intumescens</i>
?700	<i>Chara fibrosa</i>	925-625	<i>C. globularis</i>
?700	<i>C. grovesii</i>	950-650	<i>C. connivens</i>
?700	<i>C. hansenii</i>	950-750	<i>Lamprothamnium papulosum</i>
?700	<i>C. oedophylla</i>	?950-800	<i>Chara galioides</i> (?)
700	<i>C. submollusca</i>	960-750	<i>C. delicatula</i>
?710	<i>C. mauretunica</i>	?970-850	<i>Lamprothamnium aragonensis</i>
?725-425	<i>Tolypella hispanica</i>	?1000-810	<i>Chara inconnexa</i>
?730	<i>Chara kieneri</i>	1000-875	<i>C. fragifera</i>
?730	<i>C. nuda</i>	1000	<i>C. baltica</i>
750-625	<i>C. desmactantha</i>	1000	<i>C. buckellii</i>
?750-700	<i>C. crinitiformis</i>	1000	<i>C. tomentosa</i>
?750-700	<i>C. schroederi</i>	?1050-900	<i>C. nordhoffiae</i>
?750-710	<i>C. gobiana</i>	?1070-910	<i>C. compacta</i>
?750	<i>C. filiformis</i>	1100-850	<i>C. aculeolata</i>
?755-705	<i>Nitella praelonga</i>	1100-1000	<i>C. denudata</i>
?760	<i>Chara domini</i>	1100-1000	<i>C. hispida</i>
770	<i>C. handae</i>	?1125-825	<i>C. hornemannii</i>
?773	<i>Tolypella fimbriata</i>	?1140-840	<i>C. sejuncta</i>
?775-675	<i>Nitella laxa</i>	?1230-925	<i>C. corallina</i>
?780-620	<i>Chara evoluta</i>	?1335-1135	<i>Nitellopsis obtusa</i>

Data not available for following species: *Chara amplexa*, *C. brionica*, *C. burmanica*, *C. capensis*, *C. corfuensis*, *C. disjuncta*, *C. drummondii*, *C. ecklonii*, *C. excelsa*, *C. hereroensis*, *C. hippelliana*, *C. hungarica*, *C. imperfecta*, *C. javanica*, *C. kenoyer*, *C. kirghisorum*, *C. kraussiana*, *C. lamyana*, *C. leptopitys*, *C. mucronata* [nom illeg.], *C. myriophylla*, *C. phaeochiton*, *C. poopoensis*, *C. salina*, *C. scepusiensis*, *C. stachymorpha*, *C. tenera*, *C. verticulata*—*Lamprothamnium macropogon*—*Lychnothamnus barbatus*—*Nitella abyssinica*, *N. annadalei*, *N. anomala*, *N. asagrayana*, *N. bastinii*, *N. blankinshipii*, *N. brachytelea*, *N. burmanica*, *N. californica*, *N. cernua*, *N. clavata*, *N. comptonii*, *N. conformis*, *N. congesta*, *N. cristata*, *N. diffusa*, *N. dilatata*, *N. dregeana*, *N. dualis*, *N. elegans*, *N. fascicularis*, *N. gelatinosa*, *N. gloeostachys*, *N. hawaiiensis*, *N. heterodactyla*, *N. heterophylla*, *N. hookeri*, *N. intermedia*, *N. leonhardii*, *N. leptoclada*, *N. leptodactyla*, *N. leptosoma*, *N. leptostachys*, *N. longifurca*, *N. macounii*, *N. mauritiana*, *N. mexicana*, *N. microphylla*, *N. minuta*, *N. mirabilis*, *N. missouriensis*, *N. montana*, *N. muthnatae*, *N. myriotricha*, *N. obtusa*, *N. occidentalis*, *N. orientalis*, *N. partita*, *N. patula*, *N. paucicostata*, *N. penicillata*, *N. polycarpa*, *N. polycephala*, *N. polygyra*, *N. pseudoflabellata*, *N. pygmaea*, *N. robertsonii*, *N. sonderi*, *N. stellaris*, *N. stuartii*, *N. subtilissima*, *N. tasmanica*, *N. tricellularis*, *N. wattii*, *N. zeyheri*—*Nitellopsis aculeolata*, *N. sarcularis*—*Protochara inflata*—*Tolypella californica*, *T. intertexta*, *T. stipitata*.

TABLE 2.—EXTANT CHARACEAE IN ORDER OF INCREASING MAXIMUM NUMBER OF OOGONIAL CONVOLUTIONS

Convo- lutions	Species	Convo- lutions	Species	Convo- lutions	Species
3-5	<i>Nitella bonaërensis</i>	8	<i>N. tuyamae</i>	9	<i>N. praeclara</i>
4-6	<i>N. gracilens</i>	7-9	<i>Chara australis</i>	9	<i>N. tenuissima</i>
5-6	<i>N. moniliformis</i>	7-9	<i>C. corallina</i>	9	<i>Nitelopsis obtusa</i>
5-6	<i>N. oligogyra</i>	7-9	<i>Nitella bengalensis</i>	8-10	<i>Chara baueri</i>
5-6	<i>N. zeyheri</i>	7-9	<i>N. opaca</i>	8-10	<i>C. fibrosa</i>
6-7	<i>N. bipartita</i>	8-9	<i>N. acuminata</i>	8-10	<i>C. pashanii</i>
6-7	<i>N. erecta</i>	8-9	<i>N. arechavaletae</i>	8-10	<i>Nitella horikawae</i>
6-7	<i>N. musasiensis</i>	8-9	<i>N. axilliformis</i>	8-10	<i>N. lechleri</i>
6-7	<i>N. penicillata</i>	8-9	<i>N. confervacea</i>	8-10	<i>N. pusilla</i>
6-7	<i>Protochara australis</i>	8-9	<i>N. crispa</i>	8-10	<i>N. robusta</i>
6-7	<i>Tolypella coutinhoi</i>	8-9	<i>N. dimorpha</i>	9-10	<i>Chara conimbrigensis</i>
7	<i>Nitella allenii</i>	8-9	<i>N. diodgaeae</i>	9-10	<i>C. corfuensis</i>
7	<i>N. axillaris</i>	8-9	<i>N. expansa</i>	9-10	<i>C. erythrogyna</i>
7	<i>N. axillocarpa</i>	8-9	<i>N. flagelliformis</i>	9-10	<i>Nitella capitulifera</i>
7	<i>N. capillaris</i>	8-9	<i>N. flexilis</i>	9-10	<i>N. divaricata</i>
7	<i>N. shinii</i>	8-9	<i>N. furcata</i>	9-10	<i>N. globulifera</i>
7	<i>N. spanioclema</i>	8-9	<i>N. graciliformis</i>	9-10	<i>N. gloeostachys</i>
6-8	<i>N. madagascariensis</i>	8-9	<i>N. gracilis</i>	9-10	<i>N. microphylla</i>
6-8	<i>N. spiciformis</i>	8-9	<i>N. grovesii</i>	9-10	<i>N. ornithopoda</i>
6-8	<i>N. tumulosa</i>	8-9	<i>N. japonica</i>	9-10	<i>N. spinosa</i>
7-8	<i>Chara wallichii</i>	8-9	<i>N. laxa</i>	9-10	<i>N. stricta</i>
7-8	<i>Nitella alleninda</i>	8-9	<i>N. multipartita</i>	9-10	<i>N. struthioptila</i>
7-8	<i>N. coreana</i>	8-9	<i>N. pseudotenuissima</i>	9-10	<i>Tolypella comosa</i>
7-8	<i>N. fallosa</i>	8-9	<i>N. pulchella</i>	9-10	<i>T. glomerata</i>
7-8	<i>N. gracillima</i>	8-9	<i>N. sejuncta</i>	9-10	<i>T. gracilis</i>
7-8	<i>N. microcarpa</i>	8-9	<i>N. stabilis</i>	10	<i>Chara leptopitys</i>
7-8	<i>N. monodactyla</i>	8-9	<i>N. sublucens</i>	10	<i>C. mollusca</i>
7-8	<i>N. moriokeae</i>	8-9	<i>N. subtilissima</i>	10	<i>Nitella confiera</i>
7-8	<i>N. mucronata</i>	8-9	<i>N. sumatrana</i>	10	<i>Tolypella nidifica</i>
7-8	<i>N. oligospira</i>	8-9	<i>N. superba</i>	10	<i>T. palhinae</i>
7-8	<i>N. paucicostata</i>	8-9	<i>N. tanakiana</i>	9-11	<i>Chara gymnopitys</i>
7-8	<i>N. rigida</i>	9	<i>Chara hatei</i>	10-11	<i>C. schroederi</i>
7-8	<i>N. saitoiana</i>	9	<i>Nitella baronii</i>	10-11	<i>Lamprothamnium toletanus</i>
7-8	<i>N. syncarpa</i>	9	<i>N. flagellifera</i>	10-11	<i>Nitella dixonii</i>
7-8	<i>N. transilis</i>	9	<i>N. habrocoma</i>	11	<i>Chara drummondii</i>
7-8	<i>N. translucens</i>	9	<i>N. heteroteles</i>	11	<i>C. gobiana</i>
7-8	<i>N. uruguayensis</i>	9	<i>N. knightiae</i>	11	<i>C. leukenis</i>
8	<i>N. hyalina</i>	9	<i>N. lhotzkyi</i>	11	<i>Lamprothamnium macropogon</i>
8	<i>N. inversa</i>	9	<i>N. megacarpa</i>		
8	<i>N. ogivalis</i>	9	<i>N. polygyra</i>		

(Concluded on next page)

Data not available for following species: *Chara abnormiformis*, *C. amplexa*, *C. arcuatofolia*, *C. arrudensis*, *C. brittonii*, *C. buckellii*, *C. burmanica*, *C. capensis*, *C. compacta*, *C. coronatiformis*, *C. crinitiformis*, *C. cubensis*, *C. curtissii*, *C. disjuncta*, *C. domini*, *C. ecklonii*, *C. evoluta*, *C. excelsa*, *C. filicaulis*, *C. formosa*, *C. fulgens*, *C. galioides*, *C. hereroensis*, *C. hippelliana*, *C. hirsuta*, *C. hornemannii*, *C. hungarica*, *C. hypnoides*, *C. imperfecta*, *C. inconnexa*, *C. infirma*, *C. intumescens*, *C. kenoyeri*, *C. kirghisorum*, *C. kraussiana*, *C. lamyana*, *C. leiopitys*, *C. leptosperma*, *C. longifolia*, *C. morongii*, *C. mucronata*, *C. myriophylla*, *C. nordhoffiae*, *C. pallida*, *C. palmeri*, *C. pelosiana*, *C. phaeochilton*, *C. poopoensis*, *C. rusbyana*, *C. salina*, *C. sanctae-margaritae*, *C. scepusiensis*, *C. schaffneri*, *C. sejuncta*, *C. sibirica*, *C. stachymorpha*, *C. strigosa*, *C. submollusca*, *C. tanyglochis*, *C. verticulata*—*Lamprothamnium aragonensis*—*Lychnothamnus barbatus*—*Nitella abyssinica*, *N. annandalei*, *N. annularis*, *N. anomala*, *N. asagrayana*, *N. bastini*, *N. blankinshipii*, *N. blowiana*, *N. brachyletes*, *N. burmanica*, *N. californica*, *N. capillata*, *N. capitellata*, *N. cernua*, *N. clavata*, *N. comptonii*, *N. conformis*, *N. congesta*, *N. cristata*, *N. dictyosperma*, *N. diffusa*, *N. dilatata*, *N. dregeana*, *N. dualis*, *N. duthieae*, *N. elegans*, *N. fascicularis*, *N. gelatinosa*, *N. guineensis*, *N. havaiensis*, *N. heterodactyla*, *N. heterophylla*, *N. hookeri*, *N. inaequalis*, *N. intermedia*, *N. leibergii*, *N. leonhardtii*, *N. leptomochla*, *N. leptodactyla*, *N. leptosoma*, *N. leptostachys*, *N. longifurca*, *N. macounii*, *N. mauretiana*, *N. mexicana*, *N. minuta*, *N. mirabilis*, *N. missouriensis*, *N. montana*, *N. morongii*, *N. muthnatae*, *N. myriotricha*, *N. obtusa*, *N. occidentalis*, *N. orientalis*, *N. partita*, *N. patula*, *N. pauloteles*, *N. plumosa*, *N. polycarpa*, *N. polycephala*, *N. praelonga*, *N. pseudo-fabellata*, *N. pygmaea*, *N. remota*, *N. robertsonii*, *N. sonderi*, *N. sphaerocephala*, *N. stellaris*, *N. stuartii*, *N. subspicata*, *N. tasmanica*, *N. tricellularis*, *N. tuberculata*, *N. tumida*, *N. vermiculata*, *N. wattii*—*Nitelopsis aculeolata*, *N. sarcularis*—*Tolypella californica*, *T. giennensis*, *T. hispanica*, *T. intertexta*, *T. longicoma*, *T. stipitata*.

TABLE 2.—(Continued)

Convolutions	Species	Convolutions	Species	Convolutions	Species
11	<i>Tolypella fimbriata</i>	11-14	<i>C. hydropitys</i>	13-15	<i>C. brachypus</i>
10-12	<i>Chara oedophylla</i>	11-14	<i>C. pseudo-brachypus</i>	13-15	<i>C. canescens</i>
10-12	<i>C. tenera</i>	12-14	<i>C. fragifera</i>	13-15	<i>C. contraria</i>
11-12	<i>C. inermis</i>	12-14	<i>C. papillosa</i>	13-15	<i>C. denudata</i>
11-12	<i>C. javanica</i>	13-14	<i>C. concinna</i>	14-15	<i>C. baltica</i>
11-12	<i>C. socotrensis</i>	13-14	<i>C. connivens</i>	14-15	<i>C. delicatula</i>
11-12	<i>C. succincta</i>	13-14	<i>C. hispida</i>	14-15	<i>C. grovesii</i>
11-12	<i>Tolypella prolifera</i>	14	<i>C. bohemica</i>	14-15	<i>C. mauretanica</i>
12	<i>Chara altaica</i>	14	<i>C. fischeri</i>	14-15	<i>Protochara inflata</i>
12	<i>Tolypella apiculata</i>	14	<i>C. nuda</i>	15	<i>Chara tomentosa</i>
8-13	<i>Chara braunii</i>	12-15	<i>C. aculeolata</i>	13-16	<i>C. vulgaris</i>
10-13	<i>Tolypella intricata</i>	12-15	<i>C. filiformis</i>	15-16	<i>C. handae</i>
12-13	<i>Chara chrysospora</i>	12-15	<i>C. tenuispina</i>	14-17	<i>C. desmacantha</i>
12-13	<i>C. hansenii</i>	12-15	<i>C. zeylanica</i>	14-17	<i>C. globularis</i>
12-13	<i>C. kieneri</i>	12-15	<i>Lamprothamnium</i>	14-17	<i>C. muscosa</i>
12-13	<i>C. pistianensis</i>		<i>papulosum</i>	14-17	<i>C. globata</i>
13	<i>C. brionica</i>	13-15	<i>Chara aspera</i>		

TABLE 3.—EXTANT CHARACEAE IN ORDER OF INCREASING MAXIMUM OOSPORE LENGTH

Length (microns)	Species	Length (microns)	Species	Length (microns)	Species
188	<i>Nitella</i>	272	<i>N. leibergii</i>	320-270	<i>N. spiciformis</i>
	<i>pseudotenuissima</i>	275-210	<i>N. macounii</i>	320-290	<i>N. axillaris</i>
200-180	<i>N. sonderi</i>	275	<i>N. mexicana</i>	320-290	<i>N. japonica</i>
200	<i>N. habrocoma</i>	280-250	<i>N. axilliformis</i>	320-300	<i>N. inversa</i>
213	<i>N. bipartita</i>	280-250	<i>Tolypella giennensis</i>	320-300	<i>N. microphylla</i>
220-180	<i>N. gracillima</i>	280-260	<i>Nitella gracilens</i>	320-300	<i>N. pseudoflabellata</i>
220-200	<i>N. allenii</i>	280-270	<i>N. tumida</i>	320	<i>Chara morongii</i>
220	<i>N. elegans</i>	280	<i>N. annularis</i>	320	<i>Nitella dixonii</i>
221	<i>N. capillata</i>	280	<i>N. dictyosperma</i>	325-260	<i>N. graciliformis</i>
222-200	<i>N. lechleri</i>	280	<i>N. ogivalis</i>	325-272	<i>N. asagrayana</i>
225-180	<i>N. moniliformis</i>	285-265	<i>N. muthnatae</i>	325-275	<i>N. madagascariensis</i>
225-200	<i>N. waltii</i>	285-272	<i>N. transilis</i>	325-300	<i>N. heteroteles</i>
225	<i>N. supspicata</i>	290-260	<i>N. horikawae</i>	325	<i>Chara hatei</i>
228	<i>N. leptodactyla</i>	290-265	<i>N. inaequalis</i>	330-280	<i>Nitella coreana</i>
240-220	<i>N. tasmanica</i>	300-200	<i>N. gloeostachys</i>	330-280	<i>N. morioakae</i>
240-230	<i>N. stellaris</i>	300-225	<i>N. confervacea</i>	330-280	<i>N. rigida</i>
240	<i>N. leptoclada</i>	300-225	<i>Tolypella hispanica</i>	330-290	<i>N. musasiensis</i>
240	<i>N. subtilissima</i>	300-250	<i>Nitella gracilis</i>	330-300	<i>N. flagellifera</i>
249-237	<i>N. alleninda</i>	300-250	<i>N. ornithopoda</i>	330-300	<i>N. pusilla</i>
250-200	<i>N. tenuissima</i>	300-260	<i>Tolypella gracilis</i>	330-300	<i>N. spinosa</i>
250-200	<i>N. stuartii</i>	300-265	<i>Nitella bastini</i>	330	<i>N. blowiana</i>
250-230	<i>N. capitellata</i>	300-270	<i>N. dimorpha</i>	335-250	<i>N. hyalina</i>
250-230	<i>N. oligogyra</i>	300-275	<i>N. divaricata</i>	335-263	<i>N. sumatrana</i>
250-240	<i>N. dregeana</i>	300-275	<i>N. doidgeae</i>	335-300	<i>Tolypella stipitata</i>
250-240	<i>N. plumosa</i>	300-275	<i>N. phauloteles</i>	340-275	<i>Nitella acuminata</i>
250	<i>N. duthieae</i>	300-275	<i>N. praeclara</i>	340-290	<i>N. capitulifera</i>
250	<i>N. pygmaea</i>	300-280	<i>N. shinii</i>	340	<i>N. baronii</i>
255-240	<i>N. grovesii</i>	300-280	<i>N. stabilis</i>	345	<i>N. tuberculata</i>
260-180	<i>N. dualis</i>	300-280	<i>N. tanakiana</i>	350-270	<i>N. saitoiana</i>
260-250	<i>N. myriotricha</i>	300-280	<i>N. tuyamae</i>	350-285	<i>N. minuta</i>
260-250	<i>N. penicillata</i>	300-290	<i>N. lhotskyi</i>	350-400	<i>N. mucronata</i>
260	<i>N. polycarpa</i>	300	<i>N. burmanica</i>	350-300	<i>N. orientalis</i>
260-238	<i>N. morongii</i>	300	<i>N. comptonii</i>	350-300	<i>N. syncarpa</i>
270-200	<i>N. arechavaletae</i>	300	<i>N. sejuncta</i>	350-300	<i>N. vermiculata</i>
270-200	<i>N. gelatinosa</i>	300	<i>Tolypella palhinhae</i>	350-302	<i>N. flagelliformis</i>
270-235	<i>N. uruguayensis</i>	310-220	<i>Nitella erecta</i>	350-310	<i>N. leptosoma</i>
270-240	<i>N. bengalensis</i>	310-280	<i>N. sublucens</i>	350-320	<i>N. stricta</i>
270-250	<i>N. expansa</i>	320-260	<i>N. pulchella</i>	350-325	<i>N. translucens</i>

TABLE 3.—(Continued)

Length (microns)	Species	Length (microns)	Species	Length (microns)	Species
350-330	<i>N. crispa</i>	470-430	<i>N. remota</i>	650-330	<i>C. gymnopitysis</i>
350	<i>N. axillocarpa</i>	475-375	<i>N. mirabilis</i>	650-400	<i>C. aspera</i>
350	<i>N. diffusa</i>	475-400	<i>Tolypella nidifica</i>	650-500	<i>C. brionica</i>
360-260	<i>N. multipartita</i>	475-425	<i>T. comosa</i>	650-500	<i>C. phaeochiton</i>
360	<i>N. intermedia</i>	475-450	<i>T. intertexta</i>	650-600	<i>C. brittonii</i>
360	<i>N. leonhardii</i>	480-440	<i>Nitella dilatata</i>	660-500	<i>C. filiformis</i>
370-350	<i>Chara coronatiformis</i>	480-440	<i>N. monodactyla</i>	660	<i>C. imperfecta</i>
375-300	<i>Tolypella glomerata</i>	480-450	<i>Chara altaica</i>	665-615	<i>C. muscosa</i>
375-325	<i>Nitella struthiophila</i>	480-450	<i>C. pistianensis</i>	675-425	<i>C. vulgaris</i>
375	<i>N. patula</i>	480	<i>C. sibirica</i>	675-475	<i>C. amplexa</i>
380-285	<i>Tolypella californica</i>	490-440	<i>C. keukensis</i>	680-580	<i>C. evoluta</i>
380-300	<i>Nitella cristata</i>	500-375	<i>C. chrysospora</i>	680-630	<i>C. hirsuta</i>
390-345	<i>N. occidentalis</i>	500-450	<i>C. arrudensis</i>	680-630	<i>C. sanctae-</i>
400-190	<i>N. furcata</i>	500-475	<i>Nitella spanioclema</i>		<i>margaritae</i>
400-245	<i>N. tumulosa</i>	500-480	<i>Tolypella apiculata</i>	700-500	<i>C. globularis</i>
400-260	<i>N. oligospora</i>	500	<i>Chara drummondii</i>	700-500	<i>C. strigosa</i>
400-320	<i>Tolypella intricata</i>	500	<i>C. fischeri</i>	700-550	<i>C. fragifera</i>
400-325	<i>Nitella capillaris</i>	510-470	<i>C. crinitiformis</i>	700-580	<i>C. connivens</i>
400-325	<i>N. sphaerocephala</i>	520-420	<i>C. pallida</i>	700-600	<i>C. stachymorpha</i>
400-330	<i>Tolypella prolifera</i>	520-450	<i>C. tenuispina</i>	700-600	<i>Lamprothamnium</i>
400-340	<i>Nitella hawaiiensis</i>	520	<i>C. socotrensis</i>		<i>aragonensis</i>
400-350	<i>N. robusta</i>	525-400	<i>Nitella knightiae</i>	700	<i>Chara baltica</i>
400-360	<i>Tolypella longicoma</i>	525	<i>Chara desmacantha</i>	700	<i>C. burmanica</i>
400-375	<i>Nitella</i>	530-280	<i>C. hydrophytis</i>	700	<i>C. hereroensis</i>
	<i>missouriensis</i>	530-450	<i>C. hippelliana</i>	710-650	<i>C. zeylanica</i>
400	<i>Chara erythrogyna</i>	535-500	<i>Nitella californica</i>	720-500	<i>C. contraria</i>
410-360	<i>Nitella fallosa</i>	535	<i>Chara succincta</i>	720-600	<i>C. nordhoffiae</i>
420-400	<i>Chara curtissii</i>	550-350	<i>C. fibrosa</i>	720-625	<i>C. delicatula</i>
420-400	<i>C. mollusca</i>	550-500	<i>C. baueri</i>	720-660	<i>Lychnothamnus</i>
420	<i>Nitella megacarpa</i>	550-500	<i>C. hansenii</i>		<i>barbatus</i>
425-375	<i>N. opaca</i>	550	<i>C. mauretanica</i>	725-575	<i>Chara kraussiana</i>
425	<i>N. hookeri</i>	560-490	<i>Protochara australis</i>	750-425	<i>C. braunii</i>
430-330	<i>Chara leptophytis</i>	560-540	<i>Nitella praelonga</i>	750-540	<i>C. excelsa</i>
430-360	<i>C. conimbrigenis</i>	560	<i>Chara schroederi</i>	750-600	<i>Lamprothamnium</i>
430-370	<i>Nitella brachytelea</i>	570-360	<i>C. submollusca</i>		<i>papulosum</i>
440-400	<i>N. paucicostata</i>	575-500	<i>Nitella flexilis</i>	750-630	<i>Chara filicaulis</i>
440	<i>Chara hypnoides</i>	580	<i>Chara gobiana</i>	750-700	<i>C. bohemica</i>
440	<i>Nitella montana</i>	587-537	<i>C. hungarica</i>	750-700	<i>C. hispida</i>
445-400	<i>Chara pashanii</i>	600-450	<i>Nitella laxa</i>	760-560	<i>C. brachypus</i>
450-180	<i>Nitella microcarpa</i>	600-475	<i>Chara pseudo-</i>	770-730	<i>C. compacta</i>
450-400	<i>N. congesta</i>		<i>brachypus</i>	775	<i>Nitellopsis obtusa</i>
450-425	<i>N. conifera</i>	600-500	<i>C. galioides</i>	780-760	<i>Chara arcuatoifolia</i>
450-425	<i>Tolypella fimbriata</i>	600-540	<i>C. capensis</i>	800-550	<i>C. australis</i>
450	<i>Chara inermis</i>	600-540	<i>C. concinna</i>	800-560	<i>C. hornemannii</i>
450	<i>C. longifolia</i>	600-540	<i>C. inconnexa</i>	800-650	<i>C. aculeolata</i>
450	<i>C. nuda</i>	600-550	<i>C. leptosperma</i>	800	<i>C. buckellii</i>
450	<i>C. oedophylla</i>	600(?)	<i>C. leiophytis</i>	800	<i>C. globata</i>
450	<i>Nitella</i>	610-500	<i>C. wallichii</i>	820-660	<i>C. papillosa</i>
	<i>blankinshipii</i>	615	<i>C. handae</i>	820-750	<i>C. formosa</i>
460-420	<i>Chara cubensis</i>	620-510	<i>Nitella cernua</i>	825-675	<i>C. denudata</i>
460	<i>C. schaffneri</i>	625-350	<i>Chara canescens</i>	875-645	<i>C. corallina</i>
460	<i>Nitella obtusa</i>	630-560	<i>C. intumescens</i>	875-800	<i>C. tomentosa</i>
470-300	<i>N. clavata</i>	630	<i>C. ecklonii</i>	900	<i>C. domini</i>
470-400	<i>N. tricellularis</i>	636-450	<i>C. kieneri</i>	910-660	<i>C. sejuncta</i>

Data not available for following species: *Chara abnormiformis*, *C. corfuensis*, *C. disjuncta*, *C. fulgens*, *C. grovesii*, *C. infirma*, *C. javanica*, *C. kenoyeri*, *C. kirghisorum*, *C. lamiana*, *C. mucronata*, *C. myriophylla*, *C. palmeri*, *C. pelosiana*, *C. poopoensis*, *C. rusbyana*, *C. salina*, *C. scepusiensis*, *C. tanyglochis*, *C. tenera*, *C. verticulata*—*Lamprothamnium macropogon*, *L. toletanus*—*Nitella abyssinica*, *N. annandalei*, *N. anomala*, *N. bonaërensis*, *N. conformis*, *N. fascicularis*, *N. globulifera*, *N. guineensis*, *N. heterodactyla*, *N. heterophylla*, *N. leptostachys*, *N. longifurca*, *N. mauritiana*, *N. partita*, *N. polygyra*, *N. robertsonii*, *N. superba*, *N. zeyheri*—*Nitellopsis aculeolata*, *N. sarcularis*—*Protochara inflata*—*Tolypella coutinhoi*.

TABLE 4.—EXTANT CHARACEAE IN ORDER OF INCREASING MAXIMUM NUMBER OF OOSPORE STRIAE

Striae	Species	Striae	Species	Striae	Species
4	<i>Nitella shinii</i>	5-7	<i>Nitella axilliformis</i>	7-8	<i>N. bastini</i>
4-5	<i>N. gracilens</i>	5-7	<i>N. duthieae</i>	7-8	<i>N. doidgeae</i>
4-5	<i>N. moniliformis</i>	5-7	<i>N. flexilis</i>	7-8	<i>N. elegans</i>
4-5	<i>N. paucicostata</i>	5-7	<i>N. furcata</i>	7-8	<i>N. gelatinosa</i>
4-5	<i>Protochara australis</i>	5-7	<i>N. gracilis</i>	7-8	<i>N. leptodactyla</i>
5	<i>Nitella allenii</i>	5-7	<i>N. madagascariensis</i>	7-8	<i>N. leptosoma</i>
5	<i>N. annularis</i>	5-7	<i>N. phauloteles</i>	7-8	<i>N. macounii</i>
5	<i>N. capitellata</i>	6-7	<i>Chara corallina</i>	7-8	<i>N. montana</i>
5	<i>N. mexicana</i>	6-7	<i>C. pashanii</i>	7-8	<i>N. myriotricha</i>
5	<i>N. morongii</i>	6-7	<i>C. wallichii</i>	7-8	<i>N. ornithopoda</i>
5	<i>N. muthnatae</i>	6-7	<i>Nitella blankinshipii</i>	7-8	<i>N. pulchella</i>
5	<i>N. oligogyra</i>	6-7	<i>N. californica</i>	7-8	<i>N. struthioptila</i>
5	<i>N. polycephala</i>	6-7	<i>N. capitulifera</i>	7-8	<i>N. tenuissima</i>
5-6	<i>N. asagrayana</i>	6-7	<i>N. clavata</i>	7-8	<i>N. transilis</i>
5-6	<i>N. bipartita</i>	6-7	<i>N. coreana</i>	7-8	<i>N. tricellularis</i>
5-6	<i>N. erecta</i>	6-7	<i>N. crispa</i>	7-8	<i>N. tuberculata</i>
5-6	<i>N. expansa</i>	6-7	<i>N. dilatata</i>	7-8	<i>N. tumida</i>
5-6	<i>N. gracillima</i>	6-7	<i>N. dregeana</i>	7-8	<i>N. vermiculata</i>
5-6	<i>N. guineensis</i>	6-7	<i>N. fallosa</i>	7-8	<i>N. wattii</i>
5-6	<i>N. longifurca</i>	6-7	<i>N. hyalina</i>	7-8	<i>Tolypella glomerata</i>
5-6	<i>N. megacarpa</i>	6-7	<i>N. inversa</i>	7-8	<i>T. gracilis</i>
5-6	<i>N. monodactyla</i>	6-7	<i>N. japonica</i>	7-8	<i>T. hispanica</i>
5-6	<i>N. moriokae</i>	6-7	<i>N. mucronata</i>	7-8	<i>T. stipitata</i>
5-6	<i>N. musasiensis</i>	6-7	<i>N. ogivalis</i>	8	<i>Chara baueri</i>
5-6	<i>N. pusilla</i>	6-7	<i>N. oligospora</i>	8	<i>C. conimbrigenis</i>
5-6	<i>N. rigida</i>	6-7	<i>N. penicillata</i>	8	<i>C. coronatiformis</i>
5-6	<i>N. saitoiana</i>	6-7	<i>N. polycarpa</i>	8	<i>C. hypnoides</i>
5-6	<i>N. spiciformis</i>	6-7	<i>N. praelonga</i>	8	<i>Lamprothamnium</i>
5-6	<i>N. stellaris</i>	6-7	<i>N. pseudoflabellata</i>		<i>aragonensis</i>
5-6	<i>N. tanakiana</i>	6-7	<i>N. robusta</i>	8	<i>L. toletanus</i>
5-6	<i>N. tumulosa</i>	6-7	<i>N. sejuncta</i>	8	<i>Nitella blowiana</i>
5-6	<i>Tolypella coutinhoi</i>	6-7	<i>N. sublucens</i>	8	<i>N. comptonii</i>
6	<i>Nitella alleninda</i>	6-7	<i>N. sumatrana</i>	8	<i>N. confifera</i>
6	<i>N. axillaris</i>	7	<i>Chara crinitiformis</i>	8	<i>N. diffusa</i>
6	<i>N. axillocarpa</i>	7	<i>C. fibrosa</i>	8	<i>N. divaricata</i>
6	<i>N. bengalensis</i>	7	<i>C. submollusca</i>	8	<i>N. heteroteles</i>
6	<i>N. brachyteles</i>	7	<i>Nitella flagellifera</i>	8	<i>N. intermedia</i>
6	<i>N. burmanica</i>	7	<i>N. grovesii</i>	8	<i>N. knightiae</i>
6	<i>N. capillaris</i>	7	<i>N. habrocoma</i>	8	<i>N. praeclara</i>
6	<i>N. cristata</i>	7	<i>N. horikawae</i>	8	<i>N. remota</i>
6	<i>N. curtissii</i>	7	<i>N. inaequalis</i>	8	<i>N. sphaerocephala</i>
6	<i>N. dictyosperma</i>	7	<i>N. leonhardii</i>	8	<i>Tolypella palhinhae</i>
6	<i>N. dimorpha</i>	7	<i>N. lhotzkyi</i>	7-9	<i>Chara oedophylla</i>
6	<i>N. havaiensis</i>	7	<i>N. multipartita</i>	7-9	<i>Nitella arechavaletae</i>
6	<i>N. laxa</i>	7	<i>N. obtusa</i>	7-9	<i>N. hookeri</i>
6	<i>N. leibergii</i>	7	<i>N. opaca</i>	7-9	<i>N. orientalis</i>
6	<i>N. leptoclada</i>	7	<i>N. patula</i>	7-9	<i>Tolypella comosa</i>
6	<i>N. microcarpa</i>	7	<i>N. pygmaea</i>	7-9	<i>T. nidifica</i>
6	<i>N. minuta</i>	7	<i>N. spinosa</i>	8-9	<i>Chara erythrogyna</i>
6	<i>N. mirabilis</i>	7	<i>N. stabilis</i>	8-9	<i>Nitella capillata</i>
6	<i>N. missouriensis</i>	7	<i>N. tuyamae</i>	8-9	<i>N. dixonii</i>
6	<i>N. occidentalis</i>	7	<i>N. uruguayensis</i>	8-9	<i>Tolypella californica</i>
6	<i>N. plumosa</i>	7	<i>Nitellopsis obtusa</i>	9	<i>Nitella congesta</i>
6	<i>N. pseudotenuissima</i>	7	<i>Tolypella giennensis</i>	9	<i>N. lechleri</i>
6	<i>N. spanioclema</i>	6-8	<i>Nitella acuminata</i>	9	<i>Tolypella longicoma</i>
6	<i>N. stricta</i>	6-8	<i>N. cernua</i>	9	<i>T. prolifera</i>
6	<i>N. stuartii</i>	6-8	<i>N. confervacea</i>	8-10	<i>Chara inconnexa</i>
6	<i>N. subspicata</i>	6-8	<i>N. flagelliformis</i>	8-10	<i>C. strigosa</i>
6	<i>N. syncarpa</i>	6-8	<i>N. graciliformis</i>	9-10	<i>C. capensis</i>
6	<i>N. translucens</i>	7-8	<i>Chara australis</i>	9-10	<i>C. inermis</i>
5-7	<i>Chara hornemanii</i>	7-8	<i>C. leptopitys</i>	9-10	<i>C. schroederi</i>
5-7	<i>C. nordhoffiae</i>	7-8	<i>C. morongii</i>	9-10	<i>C. succincta</i>
5-7	<i>C. pallida</i>	7-8	<i>Nitella anomala</i>	9-10	<i>Tolypella fimbriata</i>

TABLE 4.—(Continued)

Striae	Species	Striae	Species	Striae	Species
10	<i>Chara buckellii</i>	11–12	<i>C. leptosperma</i>	12–14	<i>C. denudata</i>
10	<i>C. ecklonii</i>	12	<i>C. fischeri</i>	12–14	<i>C. filicaulis</i>
10	<i>C. imperfecta</i>	12	<i>C. nuda</i>	12–14	<i>C. filiformis</i>
10	<i>Tolypella apiculata</i>	9–13	<i>C. hydropitys</i>	13–14	<i>C. baltica</i>
10	<i>T. intertexta</i>	10–13	<i>C. canescens</i>	13–14	<i>C. sanctae-margaritae</i>
9–11	<i>Chara gymnopitys</i>	10–13	<i>C. intumescens</i>	14	<i>C. arcuatofolia</i>
9–11	<i>C. keukensis</i>	10–13	<i>C. pseudo-brachypus</i>	14	<i>C. brittonii</i>
9–11	<i>Tolypella intricata</i>	11–13	<i>C. galioides</i>	14	<i>C. domini</i>
10–11	<i>Chara altaica</i>	11–13	<i>C. handae</i>	14	<i>C. tomentosa</i>
10–11	<i>C. hansenii</i>	12–13	<i>C. bohemica</i>	11–15	<i>C. amplexa</i>
10–11	<i>C. palmeri</i>	12–13	<i>C. brachypus</i>	11–15	<i>C. excelsa</i>
11	<i>C. papillosa</i>	12–13	<i>C. connivens</i>	11–15	<i>C. stachymorpha</i>
11	<i>Lamprothamnium</i>	12–13	<i>C. hispida</i>	12–15	<i>C. arrudensis</i>
	<i>papulosum</i>	13	<i>C. hereroensis</i>	12–15	<i>C. globularis</i>
7–12	<i>Chara braunii</i>	13	<i>C. kraussiana</i>	12–15	<i>C. sejuncta</i>
8–12	<i>C. phaeochiton</i>	13	<i>C. mauretanica</i>	12–15	<i>C. vulgaris</i>
9–12	<i>C. fragifera</i>	10–14	<i>C. contraria</i>	14–15	<i>C. hirsuta</i>
10–12	<i>C. compacta</i>	10–14	<i>C. keineri</i>	14–15	<i>C. leiopitys</i>
10–12	<i>C. evolula</i>	11–14	<i>C. aculeolata</i>	15	<i>C. globata</i>
10–12	<i>C. zeylanica</i>	11–14	<i>C. tenuispina</i>	13–16	<i>C. desmacantha</i>
11–12	<i>C. burmanica</i>	12–14	<i>C. aspera</i>	13–16	<i>C. muscosa</i>
11–12	<i>C. chrysospora</i>	12–14	<i>C. cubensis</i>	14–16	<i>C. formosa</i>
11–12	<i>C. concinna</i>	12–14	<i>C. delicatula</i>	15–16	<i>C. tanyglochis</i>

Data not available for following species: *Chara abnormiformis*, *C. brionica*, *C. corfuensis*, *C. disjuncta*, *C. drummondii*, *C. fulgens*, *C. gobiana*, *C. grovesii*, *C. hatei*, *C. hippelliana*, *C. hungarica*, *C. infirma*, *C. javanica*, *C. kenoyeri*, *C. kirghisorum*, *C. lamyana*, *C. longifolia*, *C. mollusca*, *C. mucronata*, *C. myriophylla*, *C. pelosiana*, *C. pistianensis*, *C. poopoensis*, *C. rusbyana*, *C. salina*, *C. scepusiensis*, *C. schaffneri*, *C. sibirica*, *C. socotrensis*, *C. tenera*, *C. verticulata*—*Lamprothamnium macropogon*—*Lychnothamnus barbatus*—*Nitella abyssinica*, *N. annandalei*, *N. baronii*, *N. bonaërensis*, *N. conformis*, *N. dualis*, *N. fascicularis*, *N. globulifera*, *N. gloeostachys*, *N. heterodactyla*, *N. heterophylla*, *N. leptostachys*, *N. mauretiana*, *N. microphylla*, *N. partita*, *N. penicillata*, *N. polygyra*, *N. robertsonii*, *N. sonderi*, *N. subtilissima*, *N. superba*, *N. tasmanica*, *N. zeyheri*—*Nitellopsis aculeolata*, *N. sarcularis*—*Protochara inflata*

vary widely in caliber and point of view. Some authors are lumpers and others are splitters. Numerous newly described species have not as yet been evaluated. A reconciliation of these inconsistencies is needed, and has not been accomplished. Such defects must be recognized, and the tables handled with an element of caution.

USE OF THE TABLES

In identification of an unknown gametangium, fossil or extant, it is presumed that the worker will have determined the main features of a series of specimens (lime-shells or oogonia). First, whether they are compressed (genus *Nitella*) or round in cross section is ascertained. Then, measurements are obtained of the range in length of lime-shell (or oogonium), in number of oogonia convolutions, in length of oospore, and in number of oospore striae. The position of

each can be found in the respective tables, as well as the various species which could fit the measurements obtained. All other species are thus eliminated. Where complete data are available and all four tables are employed, retaining only those species which fit in all four tables, the writer has found that all but 1–3 names are usually eliminated. The few remaining possibilities can then be subjected by critical examination for final identification.

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MANUSCRIPT RECEIVED JUNE 24, 1957.

CORRECTIONS

CORRECTION IN SPELLING OF *CAMAROCARCINUS ARNESONI* HOLLAND AND CVANCARA, PALEOCENE CRAB FROM NORTH DAKOTA¹

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This is to call attention to an invalid original spelling (Hemming, 1953, par. 71, 1, b, i) made due to inadvertence in the heading of the species description of *Camarocarcinus arnesoni* Holland and Cvacara (1958, p. 499). Since perpetuation of this mistake would do an injustice to Mr. W. W. Arneson, discoverer of this new crab, whom

it was our intention to honor, all subsequent citations of this species should be spelled as above.

LITERATURE CITED

- HEMMING, FRANCIS, Editor, 1953, Copenhagen decisions on zoological nomenclature: London, Internat. Trust Zool. Nomen., 135 p.
- HOLLAND, F. D., JR., & CVANCARA, A. M., 1958, Crabs from the Cannonball formation (Paleocene) of North Dakota: Jour. Paleontology, v. 32, p. 495-505, pl. 74, 3 text-figs.

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CORRECTIONS IN SPELLING OF TWO INVERTEBRATE FOSSILS FROM THE LOWER CARBONIFEROUS OF NEW SOUTH WALES

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This is to call attention to the unfortunate errors in spelling of two new species, proposed by this writer in a recent paper (Jour. Paleontology, v. 32, no. 5, p. 846-888). These species are listed below, spelled correctly, and followed by page numbers which indicate where the errors occur.

- Cyathoclisia laxicolumnaris*, n. sp. (p. 846, in abstract)
- Plicochonetes sexifidus*, n. sp. (p. 846 in abstract, p. 858 in plate explanation, and on p. 868, where originally proposed)