

A report of aquatic plants (including the Characeae) and aquatic vegetation found at 33 locations in Ireland, summer 1999

JOHN BRUINSMA

Thorbeckelaan 24, NL 5694 CR Breugel, The Netherlands

This paper reports the aquatic plants and vegetation found at 33 locations during a visit of the Moeraswerkgroep (Study Group on Swamps) of the KNNV (Koninklijke Nederlandse Natuurhistorische Vereniging - Royal Dutch Natural History Society) to Ireland in 1999. Additional data were added during a subsequent visit by the author and his wife. The collective observations were made between 12 June and 5 July 1999.

Methods of Plant Collection and Recording

Only shallow water (no more than 1m deep) was sampled. Plants were sampled by hand, with a rake or by using a double rake on a 10m long cord.

The records made are quite varied in the sense that they contain both single observations (most of them of species of Charophyte) but also descriptions of aquatic vegetation types. These are distinguished in the table of results (Table 1).

All Charophytes were confirmed (and if necessary renamed) by Joop van Raam, National Herbarium, Leiden branch, Leyden, The Netherlands. *Callitriche palustris* was confirmed by Richard Lansdown (Stroud, Gloucester) as were some *Potamogeton* taxa by C. D. Preston (Institute of Terrestrial Ecology, Monks Wood, Abbots Ripton, Huntingdon). The names of all taxa have been standardized in line with Smith (1978) for mosses, Bryant and Stewart (2002) for Charophytes and Stace (1997) for vascular plants. Herbarium samples of the Charophytes have been deposited in the Herbarium, National Botanic Gardens, Glasnevin (DBN); the *Callitriche palustris* material will be deposited in the National Museum of Wales, Cardiff (NMW) and in DBN.

In addition to records of the plants and vegetation, some recording of the physical and chemical characteristics of the stretches of water were also made. pH of the water was measured using a pH-meter (pHep by HANNA instruments with standard-electrode). A conductivity meter (DIST 3 by HANNA instruments, measurements in $\mu\text{S cm}^{-1}$, automatic calculation to values at 25°C, reliability +/- 40 units) was used to measure the conductivity of the water. The alkalinity of the water was measured with a field kit (Alkalinity Set by Machery-Nagel); this is a test kit for determination of acid binding capacity up to pH 4.3.

The Records

The following site descriptions include information on the specific locations, grid references and comments regarding the records made.

1. Killashee, old sluice, Royal Canal, Co Longford. South-west of Longford at crossing with N63. N0870. The plants had just begun to dry out.
2. Lough Cullin, pontoon, North-north-east of Castlebar, Co Mayo. At bay along road between Lough Cullin and Lough Conn. G2104. Only the shallow parts of the bay were investigated. Very few plants were present between pebbles and stones.
3. Killala, Co Mayo. Small brook in pasture with large area of seepage. G1929.
4. Killala, Ross Point, Co Mayo. Dune lake, seldom flooded by the sea. G2232. Characeae spp were found in 1m deep water. In deeper water, only *Potamogeton pectinatus* could be found.
5. Lough Mask, Co Mayo. Bay at the north-west part of shore near parking place between Toormakeady and Srah. M1170. The records include some plants washed ashore.
6. Clonbur, Holy Wells, north-west of Clonbur, Co Mayo. M0160.
7. River flowing through Cong, Co Mayo. The river flows to Lough Corrib from Lough Mask. M1454.
8. Derryclare Lough below Derryclare Woods, Connemara, Co Galway. L8248.
9. Letterfrack, Connemara, Co Galway. Lake/pond at Visitors' Centre, National Park, Connemara. L7357.
10. Letterfrack, Connemara, Co Galway. Stream at Visitors' Centre, National Park, Connemara. L7357.
11. Bunowen Beg, west of Ballyconneely, Co Galway. L5944. Recording took place in a swamp.
12. Bunowen Beg, west of Ballyconneely, Co Galway. L5944. Recording took place in a stream.
13. Bunowen Beg, west of Ballyconneely, Co Galway. L5944. Pool about 70m x 30m and up to c7m deep. Deeper water superficially sampled with a double rake on a rope. Most plants were near the shore. The exceptions were: *Potamogeton natans*, *Nuphar lutea* and *Nymphaea alba*. At one side of the pool there was a large reed swamp that was not recorded. *Chara virgata* was not collected here, but in the neighbourhood at two separate locations.
14. Murroogh, the Burren, Co Clare. Stream south of Murroogh, about 200m east of the coast road. M1408. Sampling took place in almost standing water in pools between rocks. All plants with thick lime layer. Mosses were present.
15. Mongan Bog, south of Athlone, Co Offaly. In railway ditch in the transition zone between bog and esker. N0331. The esker was being used for agriculture. At one side a large reed swamp was present but was not recorded. *Lemna gibba* plants were flat and about 4mm in diameter.

16. Athlone, south bank of the Shannon, 2-3km upstream of Clonmacnois, Co Offaly. N0332. In shallow parts of the river and in ponds on the bank.
17. Lough Rea, Co Galway. Ditch alongside the Supervalu supermarket. M6116. The water flows moderately fast out of Lough Rea. The floating layer of vegetation consisted of algae and *Callitriche obtusangula*. The herbarium material of *Chara* cf. *major* was lost and as I overlooked *C. aculeolata* at other locations, the determination remains uncertain. At the edge of the lake were also *Chara aspera*, *Chara contraria* and *Zannichellia palustris*.
18. Ballinrobe, Turlough Marlagn, Co Mayo. M1765. Some of the *Chara globularis* plants from here could well be *Chara virgata*.
19. Boyne, 5km west of Drogheda, Co Meath. Just upstream of the Obelisk Bridge (near the battlefield). O0475.
20. Lough Derravaragh, north of Crookedwood, north-north-east of Mullingar, Co Westmeath. Bay north of the fishing harbour along the R394. N4663. The list in Table 1 includes plants washed ashore.
21. Side canal of the Royal Canal, east of Kilbeggan, Co Westmeath, north of Tullamore. Near the Skeahanagh Bridge. Rather open place with seepage in otherwise overgrown canal. N3534. *Chara contraria* and *Chara virgata* were identified only in collected material. Just outside the recorded vegetation plot were (Domin scores in parentheses): *Mentha aquatica* (1), *Galium palustre* (1), *Pedicularis palustris* (1).
22. Garrynagawna Bog, near Athlone, Co Roscommon. Along track off the road to Oldtown. Lower part in cut over bog. N0337.
23. Lough Ree, Hodson Bay. About 6km north of Athlone, Co Roscommon. N0145. Along the shore of the bay. Sandy soil. *Chara globularis* and *Chara contraria* were recorded but not collected; they were comparable to those of the nearby banks of the Shannon. Washed ashore were also: *Potamogeton natans*, *P. perfoliatus*, *P. crispus* and *Sparganium natans/emersum*.
24. River Brosna, upwards of the Kilnacarra Bridge, east of Clara, Co Offaly. N2932. The Brosna is a fast flowing lowland river. The soil consisted of stones and clay. Where the vegetation was recorded the stream had been dug straight through a peat area, so the banks were of peat and covered with *Phalaris arundinacea* (95% cover). The surrounding landscape was extensively used pasture. There were bushes over less than 50 per cent of the plot and so little of the water was in shadow. The water was clear, colourless and odourless.
25. Lough Talt, Co Sligo. About 15km east of Ballina, near parking place along the road. G3916. On pebbles between boulders. Recording took place where the vegetation was densest. The boulders were devoid of plants. At or near the shore were: *Eleocharis palustris* and *Equisetum palustre*. Washed ashore were: *Myriophyllum* cf. *alterniflorum* and *Littorella uniflora*.
26. Lough Corrib, Co Galway. East of Oughterard. M1443. Sheltered, sandy place along the shore. The rest of the shore was made of pebbles and stones, without Charophytes. Outside

the plot were: *Littorella uniflora*, *Baldellia ranunculoides*, *Elodea canadensis*, *Potamogeton lucens* was washed ashore.

27. Beltra Loch, Co Mayo. Bay at the east side, between Newport and Castlebar. M0797. The bottom was sand and pebbles. Outside the plot was *Callitriche hamulata*. Only *Fontinalis antipyretica* was washed ashore.

28. Galway, in the Eglington Canal, Co Galway. M2925. The water in the canal is derived from the River Corrib.

29. Gort, Co Galway. Coole Nature Reserve. On clay in the dry bed of a river emerging from the turlough Coole Lough, near the horse mill. M4204. In the open, the vegetation had been trodden by cows. This was the site for the first record of *Callitriche palustris* in Ireland (Lansdown and Bruinsma 1999).

30. Gortlecke, in the Burren, Co Clare. Stream, near Gortlecke. R3094. At the bridge on the Killinaboy-Kinvarra road, 500m south-west of the crossing with the road to the parking place of the National Park. The stream is not on the topographical map 1:50 000 and comes from a lake which is not named on the map. The records were made at the place where the stream widens just before the bridge.

31. Gort, turlough in the National Park in the Burren, Co Clare. R3194. North of the access road to the parking place of the Park. The turlough is not on the topographical map 1: 50 000. The depth at the gauge was 65cm. A fungus like spongy-mass covered the Charophytes and mosses. It may have been an alga and calcium carbonate or just calcium carbonate. It covered 80 per cent of the total area. On the shore was *Cladium mariscus* among other species.

32. Gort. Lough Bunny, Co Clare. Turlough along the R460 Gort-Corofin road. R3796. Recording was in the shallow zone along the road.

33. Durrow, Co Laois. Grantstown Lough (at the Grantstown Lake sign). S3380. The vegetation recording was carried out in the immediate surroundings of the ten fishing jetties, each about 5m x 8m, over a shore length of about 300m. There was a shallow (10-40cm) deep rim on peat. Next to this rim the depth of the water increased sharply. This deeper part is not included.

Discussion

Most botanists visiting Ireland will admire the bogs and their vegetation, but the Irish vegetation also contains a wealth of water plants. The quite varied observations reported here are the result of the recorders' interest in water plants and the habitats in which they grow. The main environmental differences between the sites visited in Ireland and The Netherlands are that in Ireland there is more rain and less intensive land use, which results in quite different nutritional levels in the soil. The result is a large number of clear, mesotrophic to slightly eutrophic waters with corresponding species and vegetation. If the results are of any value, it will be when they fit into someone else's investigations on plant distribution or similar study.

The majority of the records reported here are not new: however, they do add to the known pattern of distribution of many species. It has been possible to add

Table 1. Plant species records at 33 freshwater locations in Ireland, summer 1999 together with general vegetation information and information on water chemistry. Details of recording: P, single observation (x); SI, species list compiled (x); Isl, incomplete species list (x); T, a record of the vegetation using the Domin scale.

Site number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33			
Date sampled (1999) day, month	12,6	13,6	13,6	13,6	14,6	14,6	14,6	15,6	16,6	16,6	16,6	16,6	16,6	17,6	18,6	18,6	18,6	19,6	21,6	23,6	23,6	25,6	25,6	25,6	26,6	26,6	29,6	3,7	4,7	4,7	4,7	4,7	5,7	5,7		
Method of recording	P	SI	P	Isl	SI	P	T	SI	Isl	P	P	P	T	P	T	P	T	P	Isl	SI	T	T	T	T	T	T	T	Isl	P	T	T	Isl	T			
Plot dimensions																																				
Length of plot (m)	-	50	-	-	200	-	100	200	-	-	-	-	70	-	50	-	30	-	30	50	15	30	20	100	40	5	30	50	20	10	30	30	300			
Width of plot (m)	-	10	-	-	10	-	20	-	-	-	-	30	-	1	-	3	-	7	30	6	2	20	12	30	4	30	-	10	10	30	7	7				
Depth of water (m)	0	0-0.4	-	-	0-1	-	1-1.5	-	-	-	-	-	0-7	-	0.3	-	0.5	-	1	0.2-1	0.3	0.2	0.1-0.7	1.5	0-2	0.05-0.15	0.5	-	0	0.05-0.3	0-1	0-0.5	0.1-0.4			
Water chemistry																																				
PH	-	-	-	-	-	-	-	6.5	-	-	6.0	-	6.6	-	-	-	-	-	-	7.8	-	6.4	-	7.4	7.9	7.4	6.1	-	-	7.4	7.6	-	7.6			
ECC (conductivity, μS cm ⁻¹)	-	-	-	-	-	-	-	70	-	-	400	-	310	-	-	-	-	-	-	440	-	120	-	490	160	210	160	-	-	240	210	-	520			
Alkalinity (meq l ⁻¹)	-	-	-	-	-	-	-	0.1	-	-	2.2	-	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	-	-	-	-	-	-			
Vegetation details																																				
Total vegetation cover (%)	-	-	-	-	-	-	-	-	-	-	-	-	30	-	90	-	100	-	-	-	100	30	20	80	60	4	<1	-	-	3	100	-	50			
Cover helophytes (%)	-	-	-	-	-	-	-	-	-	-	-	-	5	-	3	-	0	-	-	-	3	2	0	<1	0	3	<1	-	-	2	0	-	40			
Cover floating layer (%)	-	-	-	-	-	-	-	-	-	-	-	-	20	-	80	-	2	-	-	-	15	0	0	2	30	1	0	-	-	0	<1	-	1			
Cover submerged layer (%)	-	-	-	-	-	-	-	-	-	-	-	-	2	-	20	-	100	-	-	-	100	30	20	80	50	1	1	-	-	1	100	-	10			
Algae																																				
Algae, filamentous							3							9		5			x		5	9	8			3					5					
<i>Enteromorpha intestinalis</i>																						5														
Bryophytes																																				
<i>Calliergon cuspidatum</i>														2																						
<i>Drepanocladus aduncus</i>				x																																
<i>Fontinalis antipyretica</i>						6	x						3							x							3									
Moss sp.																																8				
Charophytes																																				
<i>Chara aculeolata</i>				x																																
<i>Chara aspera</i>																									9								8			
<i>Chara contraria</i>																x				x	5		4					x								
<i>Chara curta</i>		x																																		

Table 1. (continued)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Charophytes (cont)																																	
<i>Chara globularis</i>							2			x						x		x			5		7										
<i>Chara hispida</i>	x																2	x			7							x					
<i>Chara rudis</i>																																	5
<i>Chara virgata</i>		x			x	x					x	x	1		2						1	5				2		x		3		x	
<i>Chara vulgaris</i> var. <i>papillata</i>				x														3	x		7							x					
<i>Chara vulgaris</i> var. <i>vulgaris</i>			x											x	5																	2	
<i>Nitella flexilis</i>										x																							
<i>Nitella opaca</i>												x																					
<i>Tolypella glomerata</i>																								3									
Vascular plants																																	
<i>Agrostis stolonifera</i>															3																	2	
<i>Alisma plantago aquatica</i>																					x	3											
<i>Apium inundatum</i>																					x											x	
<i>Apium nodiflorum</i>																									2							4	
<i>Baldellia ranunculoides</i>																																2	
<i>Callitriche brutia</i>											x																						
<i>Callitriche hamulata</i>											x																						
<i>Callitriche obtusangula</i>												3																					
<i>Callitriche palustris</i>																																x	
<i>Callitriche platycarpa</i>															3																		
<i>Callitriche stagnalis</i>															3																		
<i>Callitriche</i> cf. <i>stagnalis</i>					x																												
<i>Caltha palustris</i>				x																													
<i>Carex echinata</i>											x																						
<i>Carex nigra</i>													3																				
<i>Carex rostrata</i>																							4										
<i>Carex viridula</i> subsp. <i>oedocarpa</i>											x																						
<i>Carex viridula</i> cf. subsp. <i>viridula</i>																																2	
<i>Catabrosa aquatica</i>															4																		

many new records to the distribution of species of the Charophyte group – compare the distribution maps in Moore (1986). Apparently, this family is very much under-recorded in Ireland.

The author must apologize for not realising initially that *Callitriche palustris* was new to Ireland, and even new to the British Isles – this was because it was a new species to him also. The habitat however is classic for the species: land plants on a cow-trodden shore that had just dried out. This type of location will be quite common in turlough areas and so the species might grow at more places. The location in the Coole Nature Reserve is in the pasture just below the horse pump.

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