

# The Records of Freshwater Medusae in Indiana<sup>1</sup>

CHARLES F. LYTLE,<sup>2</sup> Indiana University

## Introduction

A considerable number of American records of the freshwater medusa, *Craspedacusta sowerbii* Lankester, have been published in the last several decades. Because of its unusual and puzzling habits, this animal has become a curiosity and has aroused the interest of a great many biologists. Medusae of this species have occurred in a number of interesting habitats. As pointed out by Pennak (8) recently, the majority of records are from small, artificial lakes or ponds which were usually less than 40 years old when medusae were observed. Among the more unusual habitats recorded are backyard fishponds, water lily tanks, flooded quarries in limestone and granite, abandoned gravel pits, and even a municipal water filtration plant. There are also a few records for large natural and artificial lakes, but these appear to be exceptional.

*Craspedacusta sowerbii* is nearly worldwide in distribution and is thought to have evolved from marine ancestors in the Yangtze River system of China. Records now exist for 30 of the United States including all those states bordering Indiana. These medusae are now found frequently enough that they can no longer be considered a rarity; however, the occurrence of medusae in any new habitat is still noteworthy since all the records for this country total only about a hundred. As a consequence, little is known about the distribution of the species except something of the general range.

In a few states like Ohio, Pennsylvania, New York, and Virginia, there are several records for freshwater medusae, but for most states we find only one or a few scattered reports. The records for Ohio and Pennsylvania were recently summarized by Dexter, Surrarrer and Davis (3); and the distribution of freshwater medusae in Maryland, Virginia, and the District of Columbia is described in my forthcoming paper. In contrast to a relatively large number of records for the state of Ohio, there are few records for the other states bordering Indiana. Illinois has five scattered records in the southeastern part of the state; Michigan has one record near the southeastern corner; and Kentucky has several records, but all except one are for parts of the Kentucky River System.

The purposes of the present report are to summarize the previous records of *Craspedacusta* in Indiana and to present 13 new reports for this state. This information was obtained in the course of our work on the development and physiology of the species and is not the result

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of an organized ecological investigation; therefore, some of the data are fragmentary.

#### Previous Indiana Records

There are published reports for *Craspedacusta* in only four places in Indiana. Payne (6) (7) reported the species in Boss Lake, a small artificial lake near Elkhart, between 1918 and 1924. This was one of the earliest reports of *Craspedacusta* in the United States, and using specimens from Boss Lake, Dean Payne worked out the complete life history of the species for the first time. Present owners of Boss Lake (now known as Crandall's Pond) recently stated that medusae appeared irregularly for some years after Payne's studies, but none have been noticed in the last eight or ten years.

Several years after Payne's work Allyn and Rettgar (1) reported medusae in a flooded gravel pit in Vigo County near Terre Haute. Medusae were seen here several times from 1932 to 1937. Medusae were observed in an old gravel pit near Franklin in Johnson County during September of 1931, but none were found on several revisits in subsequent years (2). Garner and Markle (5) and Garner (4) have reported the presence of *Craspedacusta* in Crescent Lake, a small artificial lake near Richmond. Medusae were observed during August and September of 1931, and they continued to appear for a few years, but then seemed to disappear until the late summer of 1954, when they were seen again.

#### New Indiana Records

Medusae have been recorded in 13 new localities in the state. New records continue to be added to this list, and undoubtedly many other observations of medusae remain unknown to the author. Some areas of the state have been extensively covered, others less extensively covered, the number of reports does not in all cases reflect the collection efforts in a particular area. Future study and collection will surely extend the following list of localities in which medusae have been found.

#### Discussion

This combination of the old and new records presents an interesting pattern on the map of Indiana. The 13 new records extend the known range of *Craspedacusta* across south central Indiana in a narrow belt and expand it in the northern lake district. There are at present no records for the wide strip separating these two areas, and there is a single record for the southernmost quarter of the state.

What this pattern seems to indicate is that more extensive collecting may reveal jellyfish throughout most of Indiana, particularly in the southern portion and perhaps in the north central portion, but the latter remains doubtful. Also, the large number of impoundments recently constructed in many areas of the state may prove important for the freshwater jellyfish by providing many new habitats for the species.

It is interesting to note the types of habitat in which medusae have appeared in Indiana. Of the total of 17 records, six have been in

## NEW INDIANA RECORDS

Location	County	Dates	Collectors
1. Heaton Lake	Elkhart	1951	Indiana Lake & Stream Survey
2. Diamond Lake	Noble	1952	Indiana Lake & Stream Survey
3. Syracuse Lake	Kosciusko	late 20's or early 30's	Payne
4. Winona Lake	Kosciusko	late 20's or early 30's	Payne
5. Myers Lake	Marshall	1952-55; 1957	Eberly, Lytle
6. Beanblossom Reservoir	Monroe	1955	Breneman
7. Jones Lake (artificial)	Monroe	1953; 1957	Crowell, Lytle, Barker
8. three flooded limestone quarries	Monroe	1948-1957	Crowell, Lytle
9.	"		
10.	"		
11. Yellowwood Lake (artificial)	Brown	1951-3; 1956-7	Frey
12. Ault Lake (artificial)	Brown	1953	Crowell, Owen
13. Stony Point Quarry	Clark	1957	Smith

artificial lakes, six in quarries or gravel pits, and five in natural lakes. The occurrences in natural lakes are of particular interest because there are relatively few reports of medusae in natural lakes in other parts of the country.

Another interesting feature of these medusae is the time of their appearance. Continuous observations throughout a summer have been made only rarely, so the information on the persistence of medusae populations is sketchy. However, the available data do indicate that populations in northern lakes appear later and disappear sooner than those in the southern half of the state. Medusae are generally present between July and October in south central Indiana and in August and September in northern counties. They have been observed as early as July 6 and as late as November 9 in Monroe County. The appearance and disappearance of the medusae appear to be linked with the temperature of the surface waters of the lake or pond, but as the recent work of Pennak (8) has shown, this relationship is not a simple one.

The problem of sex in these animals is a puzzling one. Although only a few medusa populations have been studied extensively, in almost every case the medusae have been either all male or all female. Only three times in the United States have both sexes been found in the same habitat. In Indiana we have studied a limited number of specimens from seven locations and have found only females. Various attempts have been made to explain this monosexual phenomenon on the basis of an ecological sex determination or on the basis of clones derived through budding from a single polyp, but the question of sex still remains unanswered.

One word should be added about the polyp generation. The hydroids of this species are very small, inconspicuous and difficult to collect. So far they have been collected in only three habitats in this state: Boss Lake, Myers Lake, and Red Dog Quarry, near Bloomington. Their presence in the other habitats is almost certain, for it is a particular series of events in the life of the polyp generation which determines the formation of medusae.

### Summary

Freshwater medusae have occurred in thirteen new localities in Indiana, presenting a discontinuous pattern of distribution extending to all four borders of the state. The medusae were observed most commonly in artificial habitats, as limestone quarries, gravel pits, and artificial lakes. Five occurrences have been in natural lakes in the northern lake district. Specimens examined from seven locations were all female. Medusae were usually present between July and October in south central Indiana and in August and September in northern counties.

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