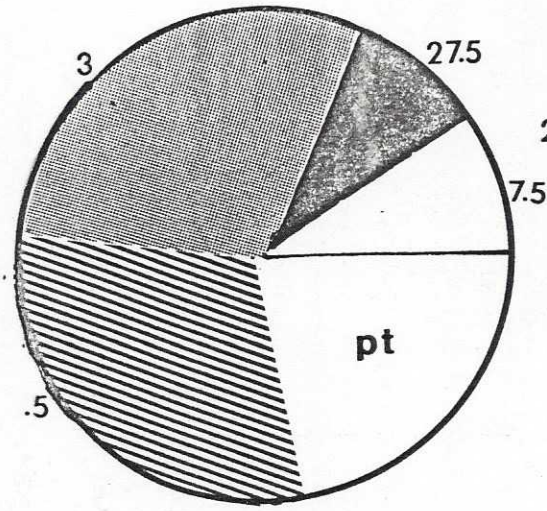
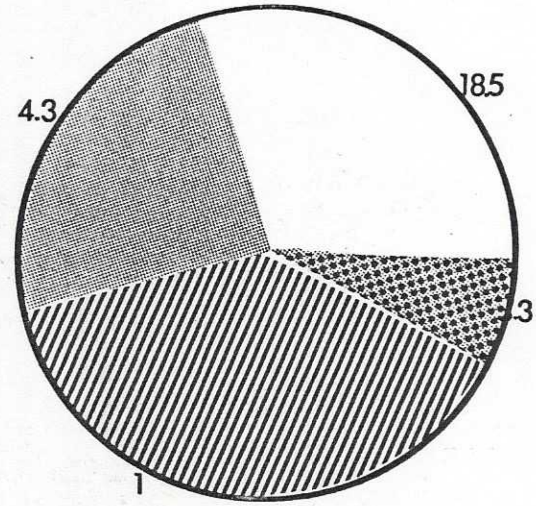
PUMPKINSEED

GROUP 1

12-45mm

2 Sample size 4

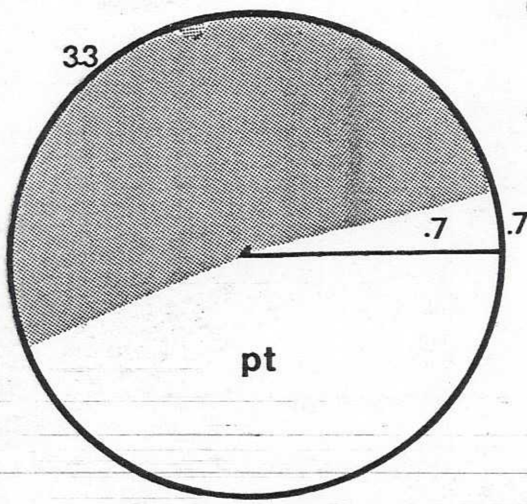


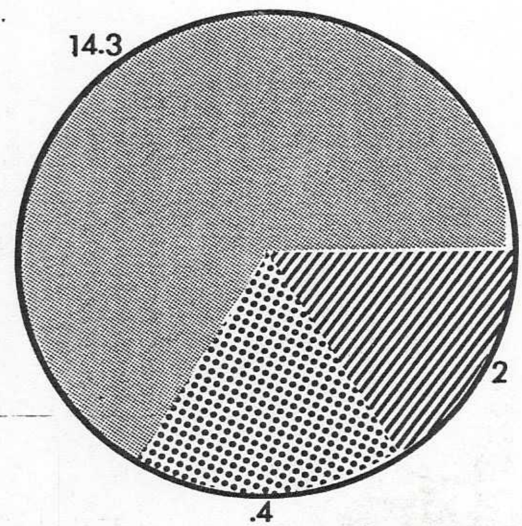


GROUP 11

48-95mm

4 Sample size 9

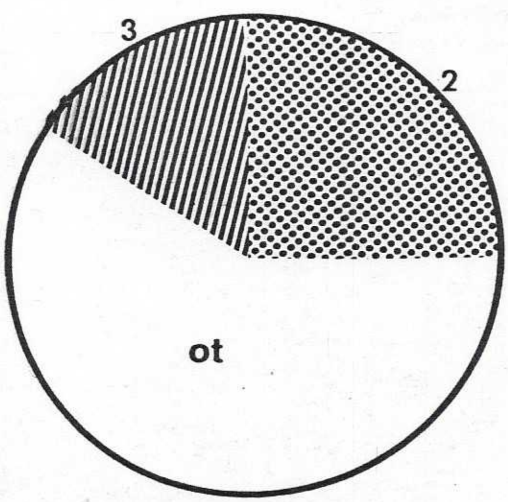


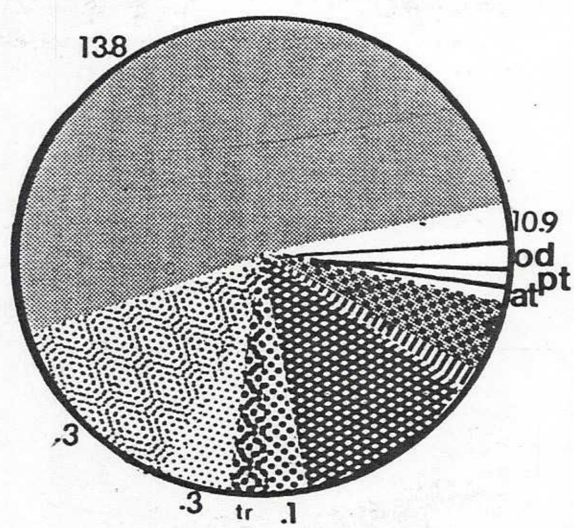


GROUP 111

96-145mm

1 Sample size 27





MAY

JULY

data for May are inconclusive as the data is based on a single fish whose stomach contained an adult coleopteran.

The overall picture is of a generalist benthic feeder selecting prey by size as described by Keast and Welsh (1968) and Reid (1930) (cited in Scott and Crossman, 1974).

Rock Bass

(N=78;group I M=26,J=0;group II M=0,J=1)

Two size categories of Rock Bass are distinguished in Figures 27 and 28. These represent the one year old fish from May and a single full stomach of a 144 mm fish from July respectively.

Group I fish take a broad range of benthic and planktonic organisms with a numerical emphasis on Cladocera and a volume emphasis on chironomids. Trace numbers of the larger bodied insect nymphs contribute less than 3% each to the volume, Amphipods (6.8%) and terrestrial insects (8.5%) are more important.

The group II fish contained 2 small decapods (0 - 10 mm) for 99% of the stomach volume.

Keast (1965) describes a juvenile diet of small benthic invertebrates with an early transition to larger and larger prey (Odonata nymphs ; up to 75%, Ephemeroptera 35%, Trichoptera 35%, fish fry 30%, crayfish >15%) facilitated by the wide mouth aperture (Keast and Webb, 1966). The climax diet is described as almost exclusively Decapoda and Anisoptera nymphs. This agrees with the observed diet for Sunfish Lake.

Figure 27:

A scatter plot of length versus weight for the Rock Bass. The size divisions corresponding to Groups are shown.

Group 1	30-50 mm
Group 2	120-145 mm

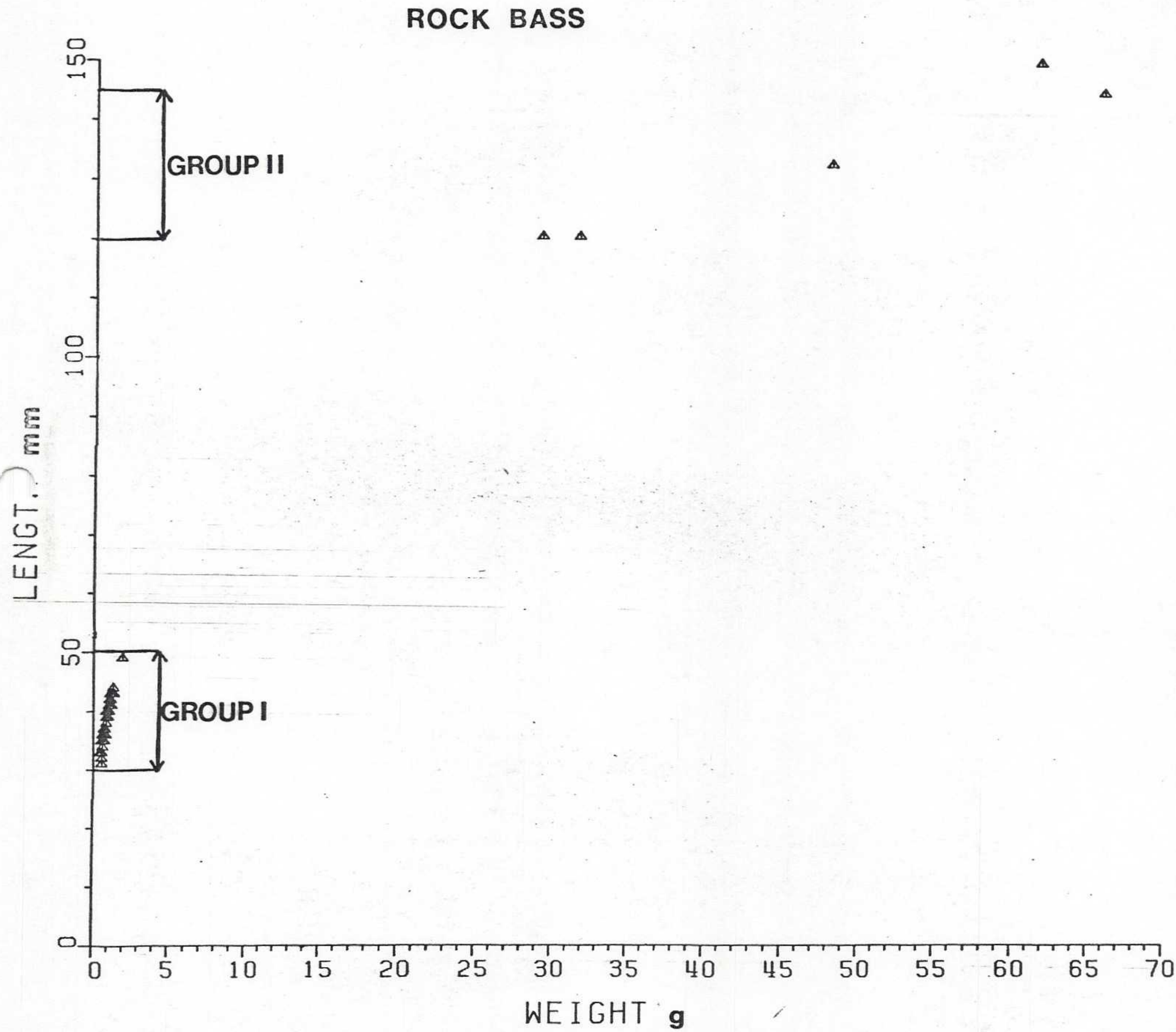
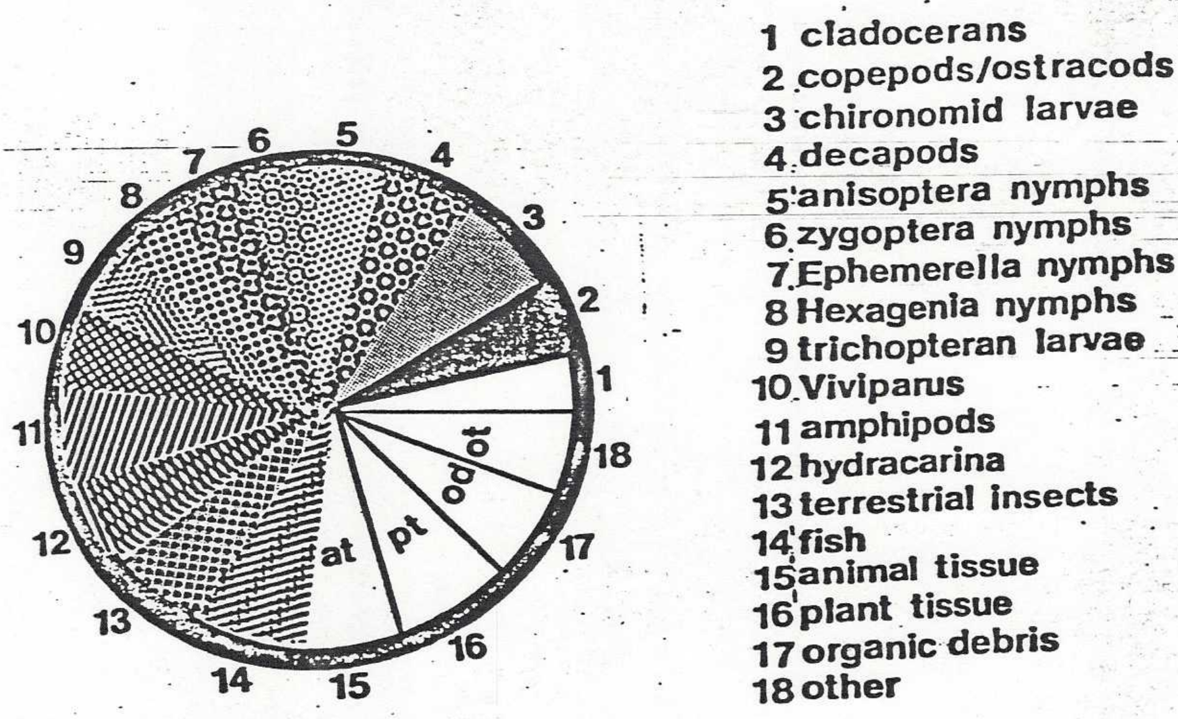
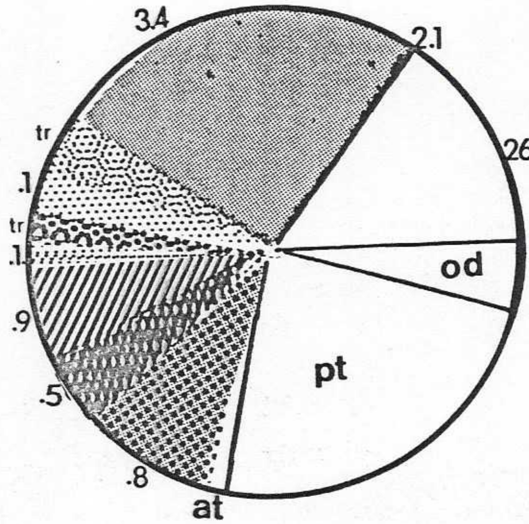

ROCK BASS
GROUP II
GROUP I
LENGTH mm
WEIGHT g
0
50
100
150
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70

Figure 28:

The diet of the Rock Bass. The size of each slice represents the percent volume contribution of each prey taxocene to the total stomach contents. The peripheral numbers are the mean number of prey items this would represent. The sample size is shown fro each diagram.



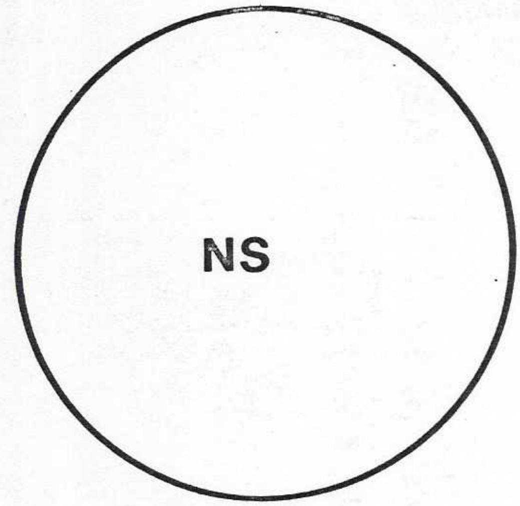
ROCK BASS

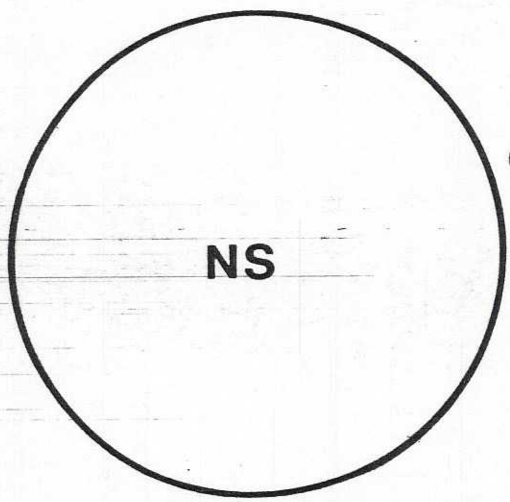


GROUP 1

30 - 50 mm

26 Sample size 0

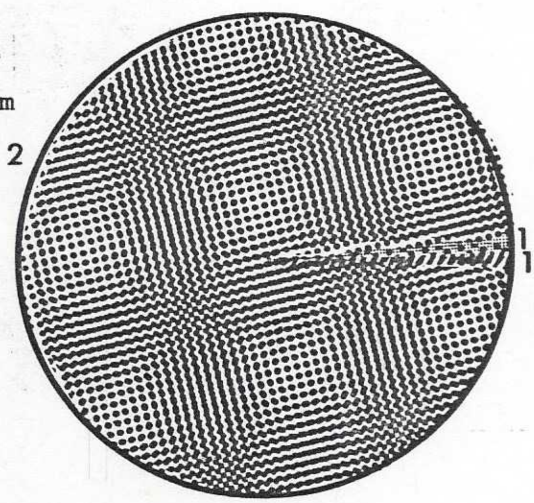




GROUP 11

120-145 mm

0 Sample size 4



MAY

JULY

Largemouth Bass

(N=57;group I M=,J=8;group II M=1,J=8)

Two size categories of Largemouth Bass are distinguished in Figures 29 and 30. Based on growth rates in Scott and Crossman (1974), group I contains only one year old fish.

In May, the diet of group I fish is dominated by cladocerans (35%) with Odonata nymphs (Anisoptera 10%, Zygoptera 10%), Ephemerella (17.5%) and Hyalella (10%) making significant volume contributions. In July the amphipod, Hyalella, increases in importance (26.3%) relative to the cladocera (16.3%) and fish become the most important resource on a volume basis (38.7%). Group II fish are also piscivorous although chironomids (44%) and decapods (12.5%) are of greatly increased importance and plant tissue has become the most bulky stomach content.

The large mouth aperture enables Largemouth Bass to become piscivorous at just 50 mm in length (Scott and Crossman 1974) and the above diet correlates well with that described by Keast and Webb (1966) who indicate that the juvenile, after a brief (1 - 2 month) dietary concentration on Cladocera, shifts to benthic inverteb-

Figure 29:

A scatter plot of length versus weight for the Largemouth Bass. The size divisions corresponding to Groups are shown.

Group 1	30-120 mm
Group 2	190-240 mm

LARGEMOUTH BASS

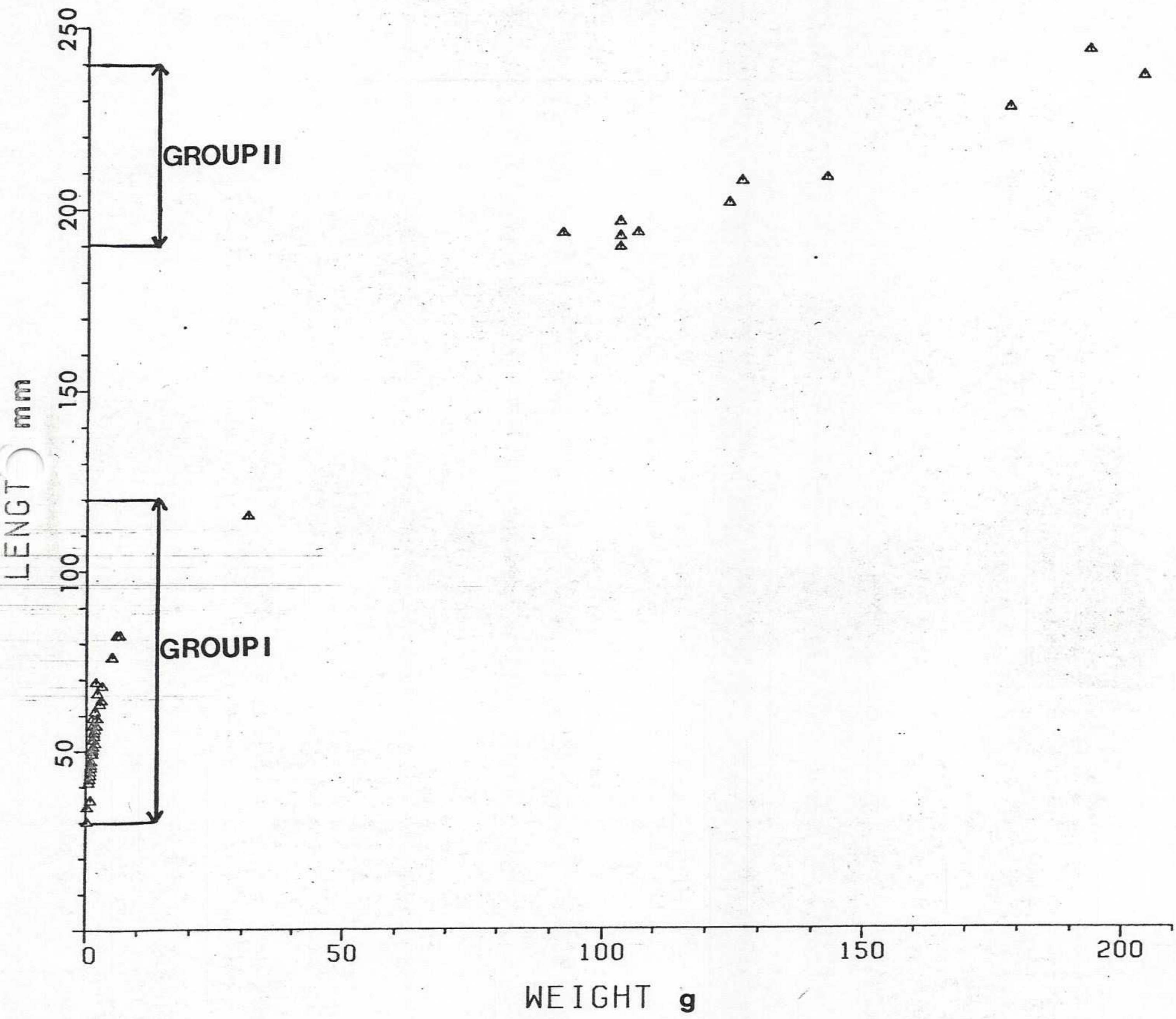
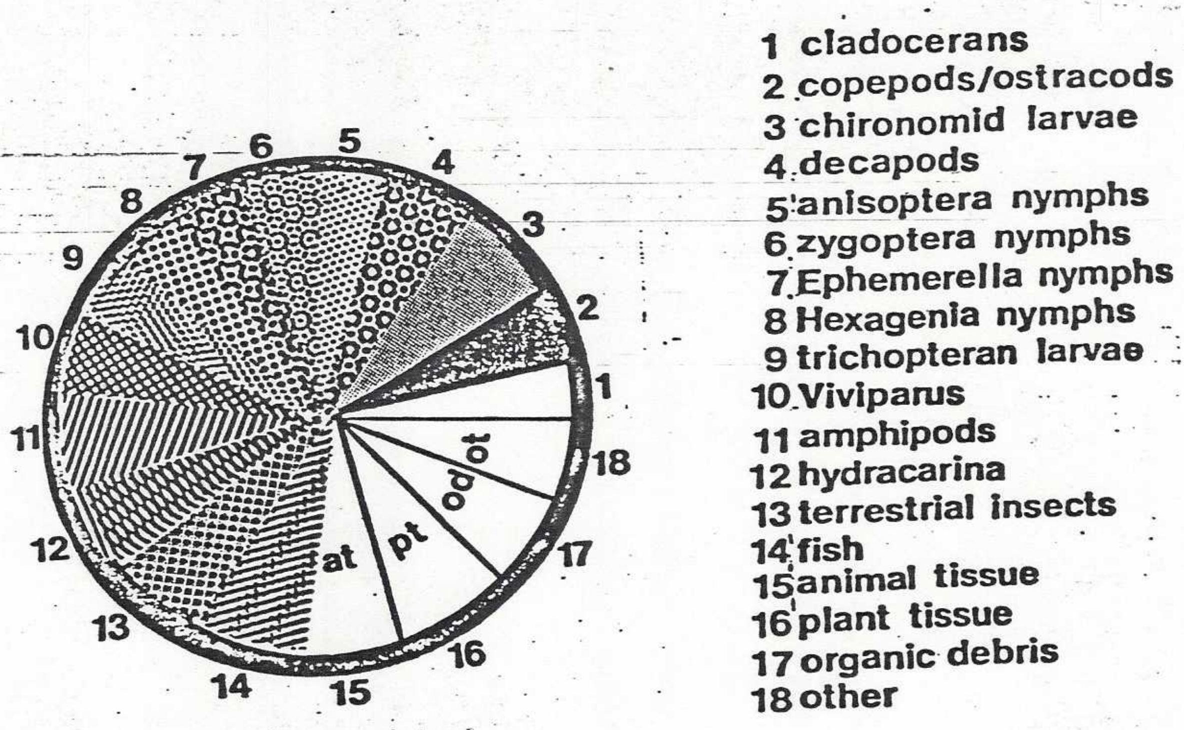


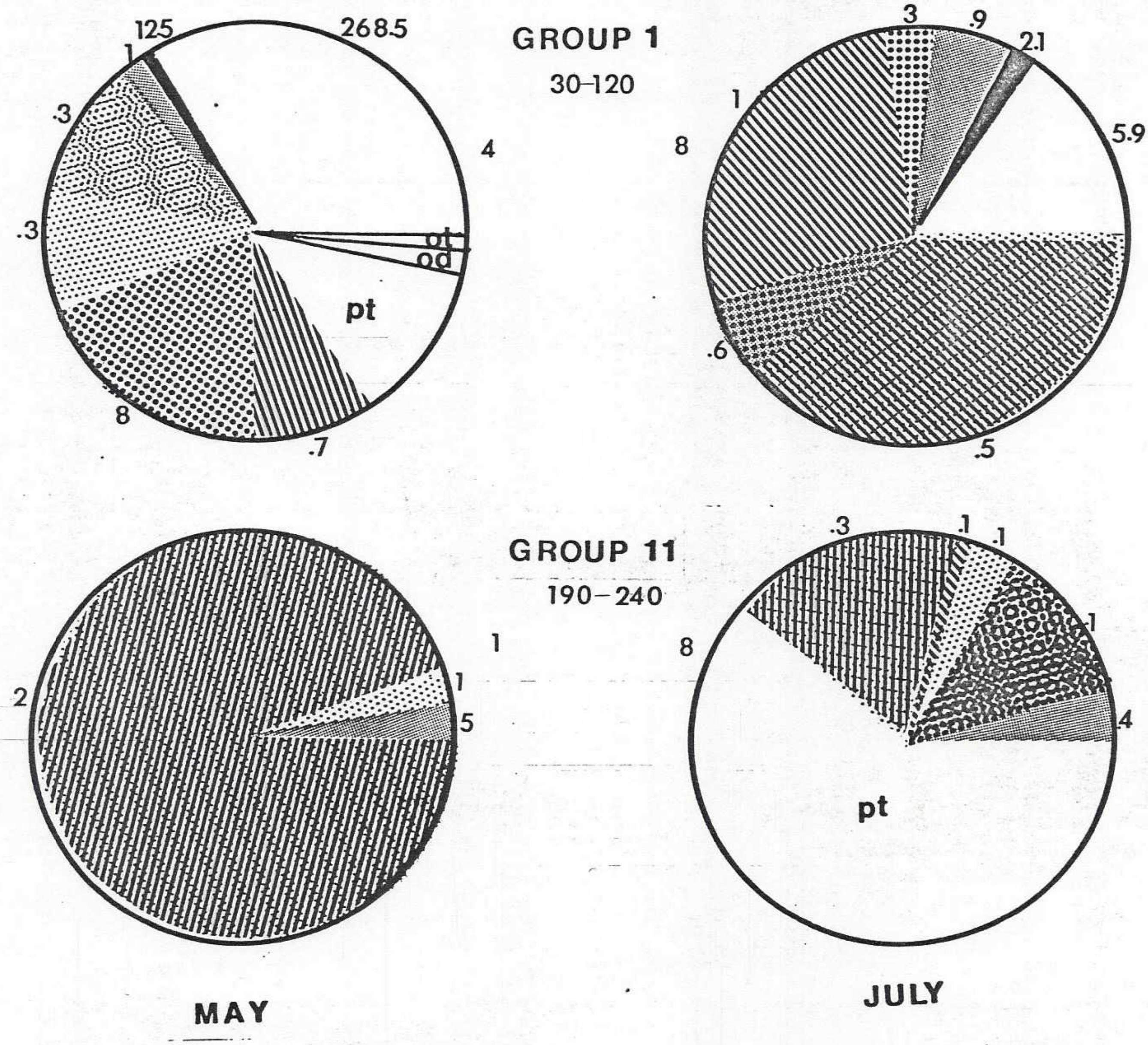
Figure 30:

The diet of the Largemouth Bass. The size of each slice represents the percent volume contribution of each prey taxocene to the total stomach contents. The peripheral numbers are the mean number of prey items this would represent.

The sample size is shown for each diagram.



LARGEMOUTH BASS



rates of the largest size that the mouth morphology will permit. From the benthic diet the Largemouth Bass shift quickly into a climax diet of fish. An apparent trend in Sunfish Lake is however, to retain a significant cladoceran and copepod component in the diet for a proportionately longer time than has been recorded for other systems.

Smallmouth Bass
(N=2;no analysis)

Two young of the year Smallmouth Bass were caught during September but no stomach content analysis has so far been completed.

Iowa Darter
(N=160;group I M=5,J=1:group II M=19,J=3)

Lengths of Iowa Darters show a bimodal distribution so two size categories were distinguished in figures 31 and 32. They are 28-40 mm and 41-54 mm. The species thought to have a 2 year life cycle in Southern Ontario, (Winn 1958a in Scott and Crossman 1974). Iowa Darters are present in great numerical abundances in the Chara growth of the littoral zone. One or more Darters were routinely caught in surface ekman samples.

Figure 31:

A scatter plot of length versus weight for the Iowa Darter. The size divisions corresponding to Groups are shown.

Group 1	28-40 mm
Group 2	41-54 mm

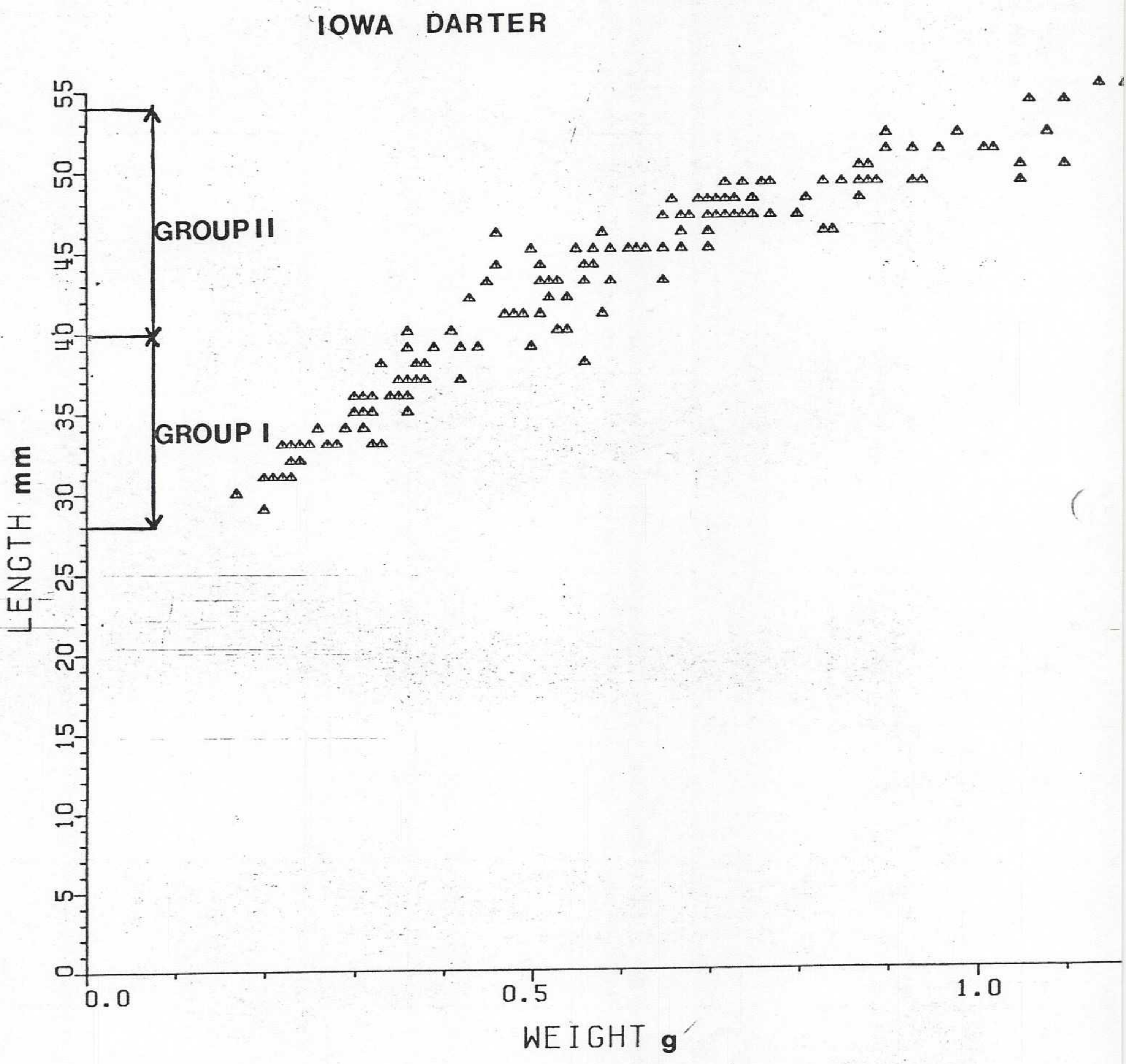
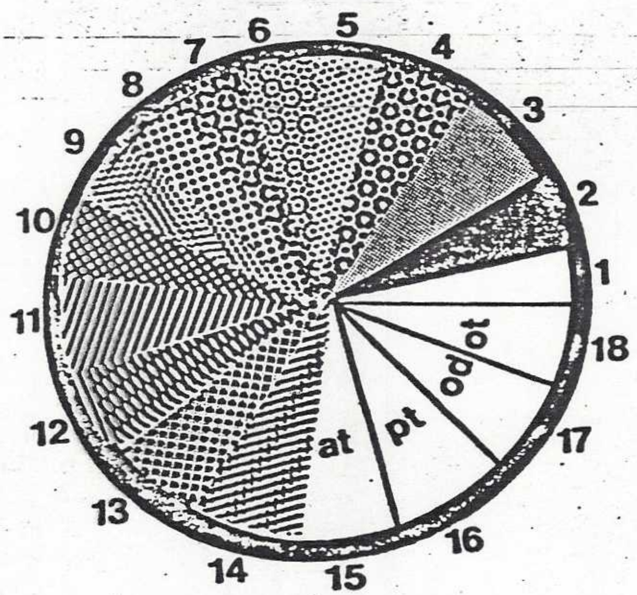

IOWA DARTER
GROUP II
GROUP I
LENGTH mm
55
50
45
40
35
30
25
20
15
10
5
0
0.0
0.5
1.0
WEIGHT g

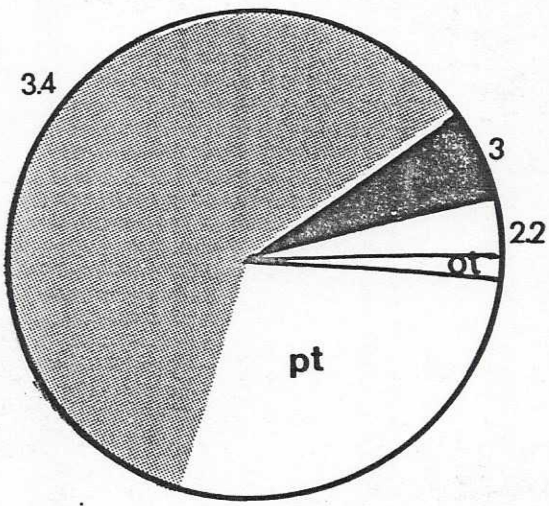
Figure 32:

The diet of the Iowa Darter. The size of each slice represents the percent volume contribution of each prey taxocene to the total stomach contents. The peripheral numbers are the mean number of prey items this would represent. The sample size is shown for each diagram.



1 cladocerans
2 copepods/ostracods
3 chironomid larvae
4 decapods
5 anisoptera nymphs
6 zygoptera nymphs
7 Ephemerella nymphs
8 Hexagenia nymphs
9 trichopteran larvae
10 Viviparus
11 amphipods
12 hydracarina
13 terrestrial insects
14 fish
15 animal tissue
16 plant tissue
17 organic debris
18 other

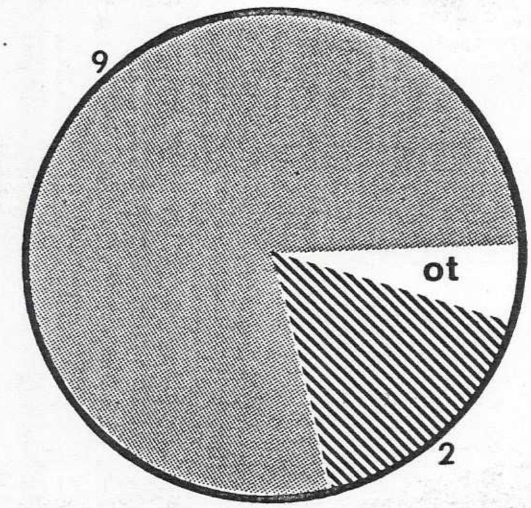
IOWA DARTER

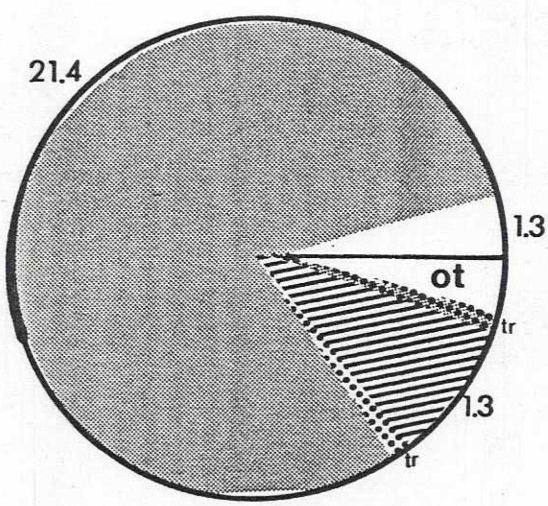


GROUP 1

28 -40 mm

5 Sample size 1

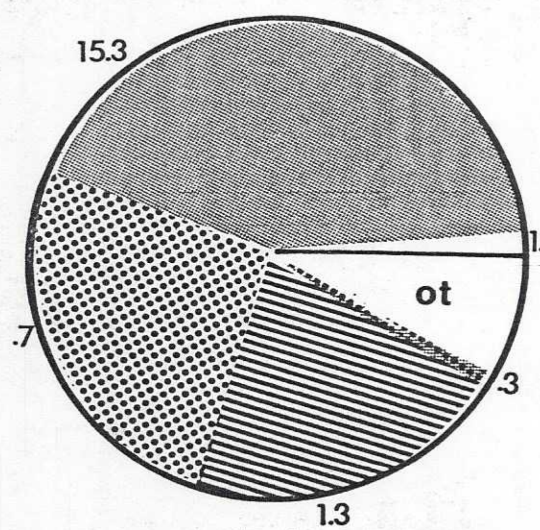




GROUP 11

41-54 mm

19 Sample size 3



MAY

JULY

For group I fish the diet is dominated by chironomid larvae (58%). Their importance increases in July (80%) and amphipods contribute secondarily to the bulk (15%). Group II fish depend on chironomid larvae for 79.7% of the stomach volume in May. In June, the diet is still dominated by chironomid larvae (43.4%) but Ephemerella and Hyalella both contribute over 20% of the volume. Cladocera are never particularily important in terms of numbers or volume. This range of diet encompassing Cladocera, chironomid larvae and mphipoda appears to be characteristic of the species (Turner 1921 in Scott and Crossman 1974).

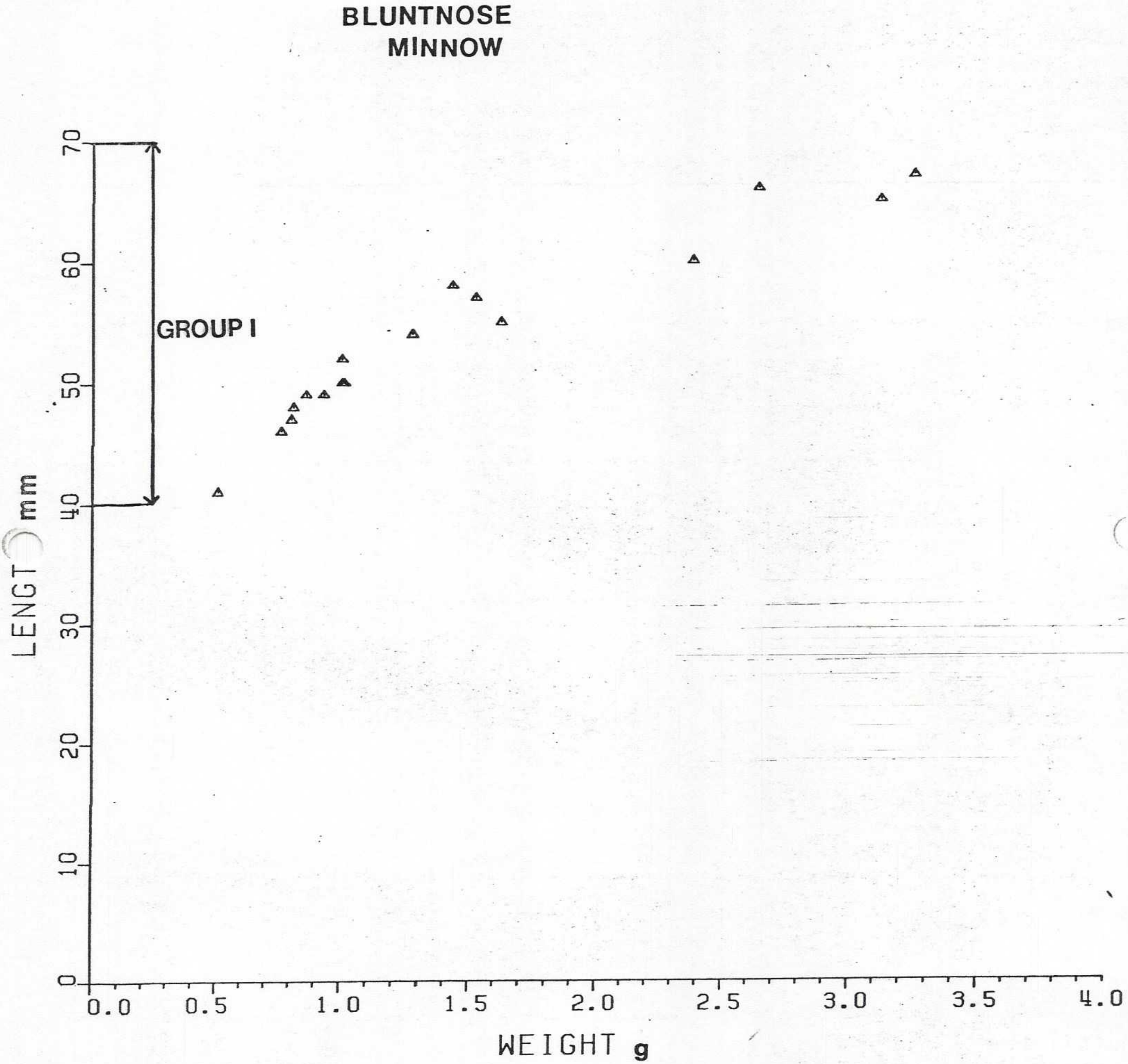
Bluntnose Minnow
(N=19:M=14, J=0)

Stomach content analysis for the Bluntnose Minnow (figures 33, 34) are based on fish caught during May. Like the White Sucker, the Minnow has a very small stomach so contents of the gut to the first major constriction were considered. Even so, many of the stomachs were empty. the majority of the stomach bulk consisted of organic detritus (63.2%). Minimal numbers of Cladocera (5%) and chironomids (7.8%) were found. This reflects the food habits described by Keast and Webb (1966) relative to the inferior mouth position.

Figure 33:

A scatter plot of length versus weight for the Bluntnose Minnow. No size groups were distinguished.

Group 1 40-70 mm


BLUNTNOSE MINNOW
GROUP I
LENGTH mm
WEIGHT g
0
10
20
30
40
50
60
70
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0

Brook Stickleback

(N=2: M=2,J=0)

Figures 35 and 36 show the stomach contents of two Sticklebacks caught during May. Cladocerans are the most important food item by bulk (50%) while ostracods and copepods are numerically the most abundant (1002 individuals per stomach). Chironomid larvae (15%), amphipods (11%), and organic matter (10%) make up the remainder of the diet. This diet indicates a greater emphasis on feeding in the water column (Cladocera and ostracods) than was reported by Dymond (1926) or Rickler (1932) (both in Scott and Crossman 1974) although ostracods are listed an an important dietary item in Lake Nipigon.

Brown Bullhead

(N=1: M=1, J=0)

Only one individual was caught in the course of sampling. It was relatively large (196 mm, 984 g) and was probably in its fourth summer based on growth rates in Scott and Crossman (1974). 45% of the stomach volume consisted of Cladocera, 30% of animal tissue, 20% of terrestrial insects and 5% of chironomids (figure 36). The bullhead is generally a nocturnal, chemosensory feeder (Keast 1967) and feeds on a very wide variety of