

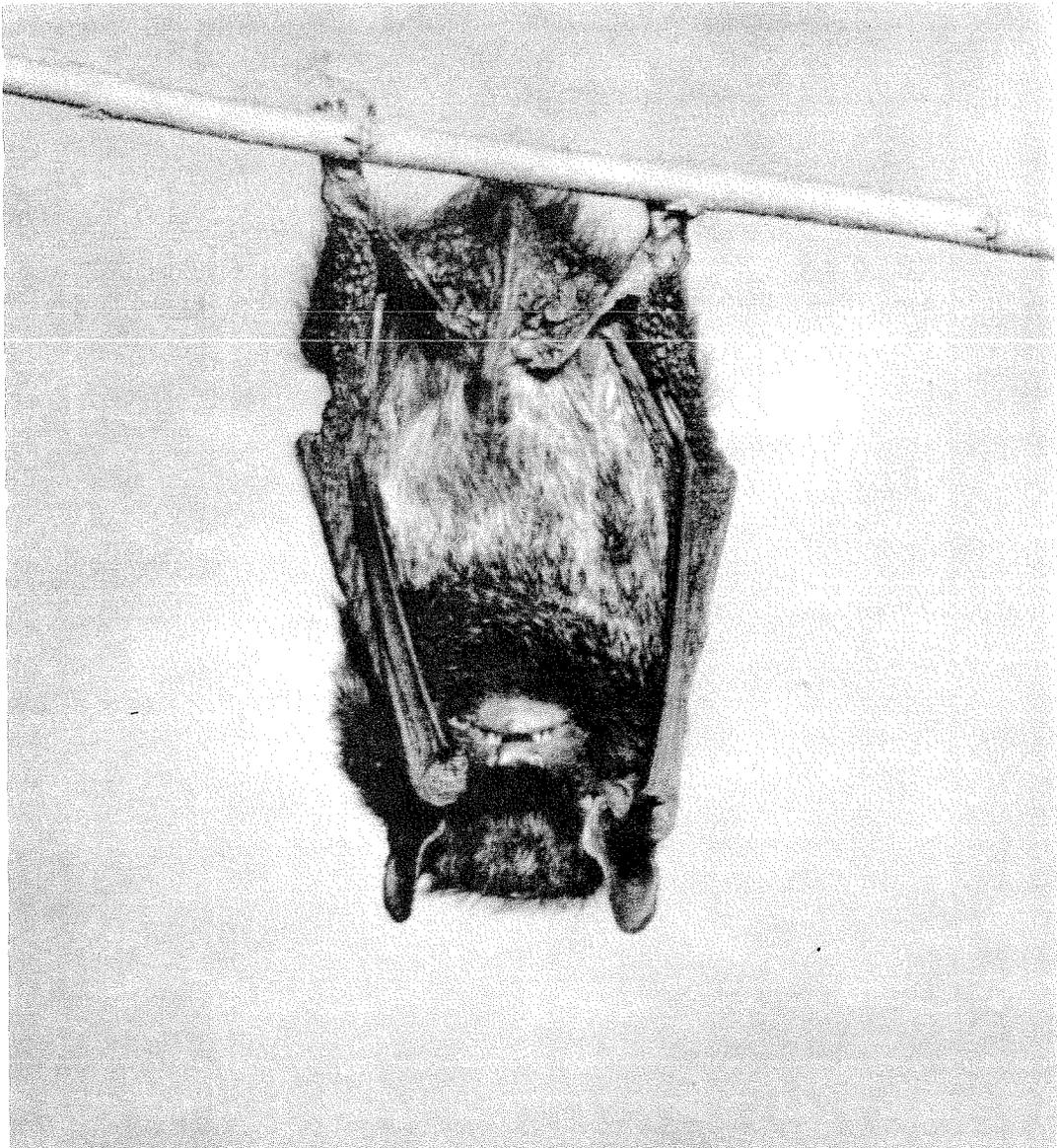
FILE COPY

Annual Performance Report

Nongame and Endangered Wildlife Program

July 1991-June 1992

Volume I



North Carolina Wildlife Resources Commission
Division of Wildlife Management

ANNUAL PERFORMANCE REPORT

State: North Carolina

Project Number: ES-3

Segment Number: 9

Period Covered: July 1, 1991 to June 30, 1992

Project Title: North Carolina Endangered Species

SECTION I (RESEARCH AND SURVEY)

Subsection: North Carolina Mussels

Objectives:

1. To complete a threat analysis for the Tar River spiny mussel in the Swift Creek Sub-basin of the Tar River Basin to include existing and future threats in a five county area - Vance, Warren, Franklin, Nash, and Edgecombe counties.
2. To monitor the Swift Creek population of the Tar River spiny mussel, expand effort to find live individuals and determine microhabitat needs, determine period of gravidity and describe glochidia, examine Swift Creek fish species for attached Tar River spiny mussel glochidia

A. Activity

Threat Analysis

The threat analysis for the Tar River spiny mussel was completed on schedule by Christopher McGrath. This document is included after Section F in this report.

Swift Creek Tar River Spiny Mussel Population Monitoring

As a result of canoe surveys from SR 1310 to NC 48 in Nash County's Swift Creek during the past four years and as a result of intensive substrate surveys above SR 1003 during 1991 and 1992, it appears that the Tar River spiny mussel population between SR 1310 to SR 1003 is healthy. However, because of significant sedimentation of habitat below SR 1003 to NC 48 caused by forestry and agricultural practices, it appears that the mussel community may be declining in this creek reach (Figures 1 - 10).

Microhabitat Needs

The Tar River spiny mussel occurs in well oxygenated, circum-neutral pH waters in Swift Creek. The preferred substrates for this species are mixtures of coarse sand and gravel (Figure 11). Significant quantities of cobble are also seen in some of the Tar River spiny mussel beds. Only

once in Swift Creek has an individual been found in coarse sand.

Period of Gravidity and Description of Glochidia

As seen during 1991 and 1992, the Tar River spiny mussel is a tachytictic breeder with its period of gravidity starting during the last two weeks of May and ending during the first two weeks of July. The females use the entire outer demibranchs to brood the glochidia. Gills with fully mature glochidia appear tan to grayish in color. Based upon a limited sample, females appear to first become gravid during their fourth year (approximately 25 mm long) with gravidity extending into at least year eight (>42 mm long).

The Tar River spiny mussel's glochidium is very similar to the James spiny mussel's glochidium. Tar River spiny mussel glochidia are subcircular and spineless. The shell surface is quite smooth. Length is 0.17 mm; height is 0.16 mm; and width is 0.13 mm. As in the James spiny mussel, the shells of the glochidia are very broadly rounded toward the ventral margin, and the margins of the shell have distinctive "lips" which have not been seen on any of the other Swift Creek mussels' glochidia.

Fish Host(s)

Field conditions during most of June, 1992 were very poor. During most of the month, heavy rainfall events occurred in the Swift Creek Subbasin making it very difficult to acquire data on preferred fish hosts of the Tar River spiny mussel. However, fish were collected on July 2, 1992 in an area below a significant Tar River spiny mussel bed, and these fish will be examined for attached glochidia during the fall and winter months. During the coming two years, Wildlife Resources Commission biologists will continue to expand efforts to confirm fish hosts for this species.

Through Section 6 funding (via a North Carolina Wildlife Resources Commission contract), Mark Hove (1990) determined that up to eleven species may serve as fish hosts for the James spiny mussel. There is a high probability that at least the following Swift Creek fish species are fish hosts for the Tar River spiny mussel: rosyside dace (Clinostomus funduloides), bluehead chub (Nocomis leptcephalus), and pumpkinseed (Lepomis gibbosus). Each fish is found in habitats associated with both spiny mussel species, and each fish is a fish host for the James spiny mussel. This high probability that the James and Tar River spiny mussels share several of the same fish hosts is enhanced by the following facts which show that these two mussel species are probably closely related:

1. The periods of gravidity and glochidial release are approximately identical.
2. The glochidia of both species are very similar in shape, size, and surface texture.
3. The entire outer demibranchs in gravid females are used to brood glochidia, and these demibranchs turn a light tan to grayish color when the glochidia are mature.

B. Target Dates for Achievements and Accomplishments

The threat analysis was prepared on schedule. The determination of the period of gravidity and description of glochidia were accomplished on schedule. Our understanding of microhabitat needs has been better refined. However, very significant storms resulting in high, turbid water during late May and June, 1992 in Swift Creek have hindered our ability to determine the fish host(s) for the species. Work to monitor the species and confirm the fish host(s) will continue into the future.

C. Significant Deviations

Although weather conditions have hindered our efforts to determine the Tar River spiny mussel's fish host(s) during June, 1992, we will continue to work during 1992 - 1993 to complete this objective. Results of this work will be reported in next year's Annual Performance Report.

D. Remarks

None

E. Recommendations

1. Various wastewater treatment plants appear to be in noncompliance with their NPDES permit limits. There is a high probability that these plants may be a major cause of the decline in the *E. steinstansana* local populations in the Tar River. Both the federal and state governments need to ensure compliance by these plants.
2. Local landowners along Swift Creek need to be encouraged to use Best Management Practices to ensure the continued survival of the Swift Creek aquatic ecosystem. Federal financial support to help develop a "How to Protect Swift Creek Drainage Basin" manual for local landowners and local government officials is needed.

3. The North Carolina Wildlife Resources Commission is in the process of requesting High Quality Waters status for Swift Creek from the N.C. Environmental Management Commission. U.S. Fish & Wildlife Service support for this proposal is needed.
4. Protective local zoning is needed to ensure the continued viability of the Swift Creek aquatic ecosystem.
5. Because of the numerous problems present in the Swift Creek Drainage Basin, there is a great need to monitor its mussel community each year.
6. If possible, an experimental population of *E. steinstansana* should be established in a relatively clean reach of Fishing Creek.

F. Cost:

\$30,667

Literature Cited

Hove, M.C. 1990. Distribution and life history of the endangered James spiny mussel, *Pleurobema collina* (Bivalvia: Unionidae), Master of Science Thesis, Virginia Polytechnic Institute and State University.

Prepared By: _____

John Alderman
Piedmont Project Leader
Nongame and Endangered Wildlife Program

Elliptio steinstansana
Swift Cr., Nash Co., SR 1310 - 1003

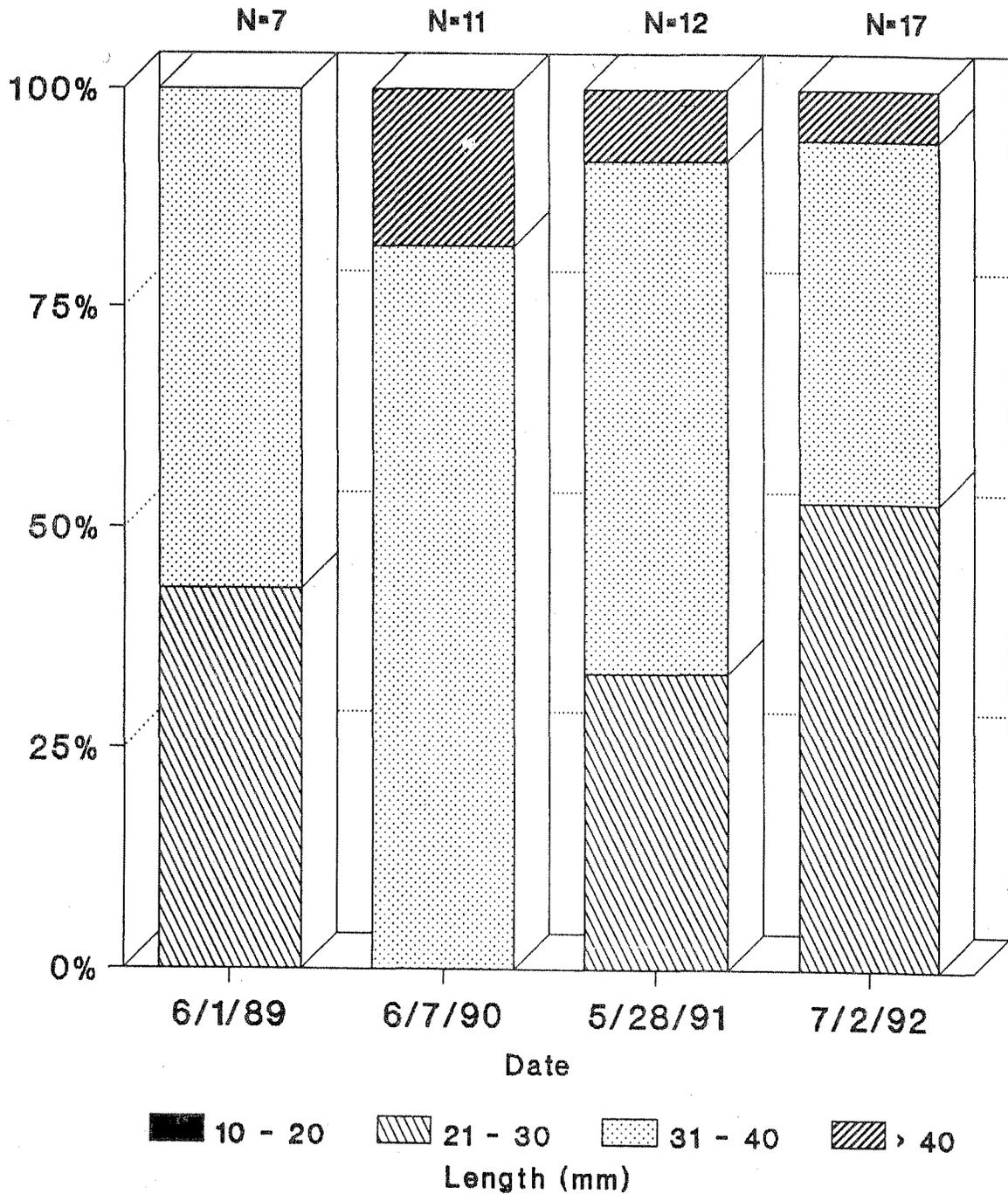


Fig. 1. Specimens from muskrat middens

Fusconaia masoni
Swift Cr., Nash Co., SR 1310 - 1003

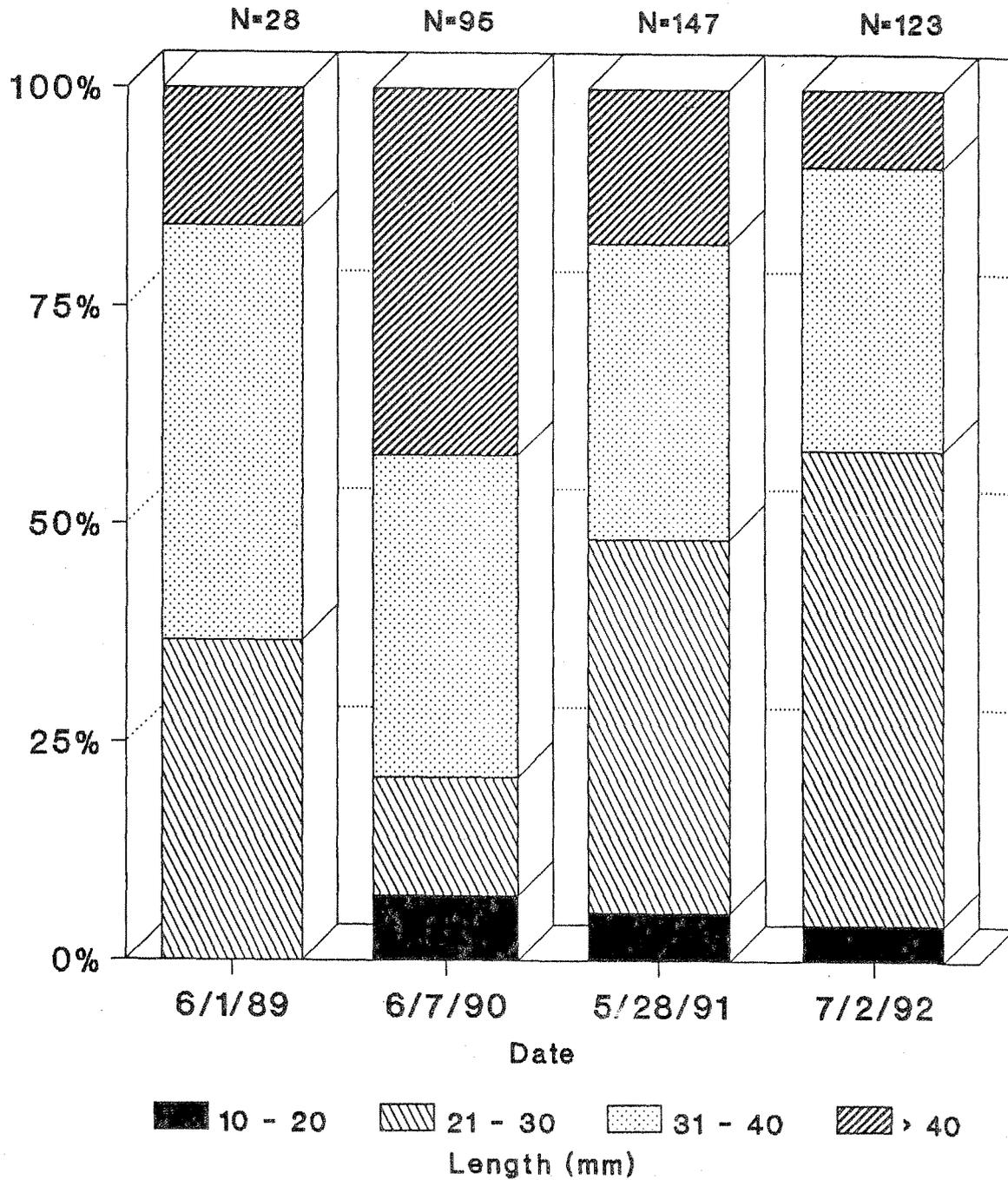


Fig. 2. Specimens from muskrat middens

Elliptio lanceolata
Swift Cr., Nash Co., SR 1310 - 1003

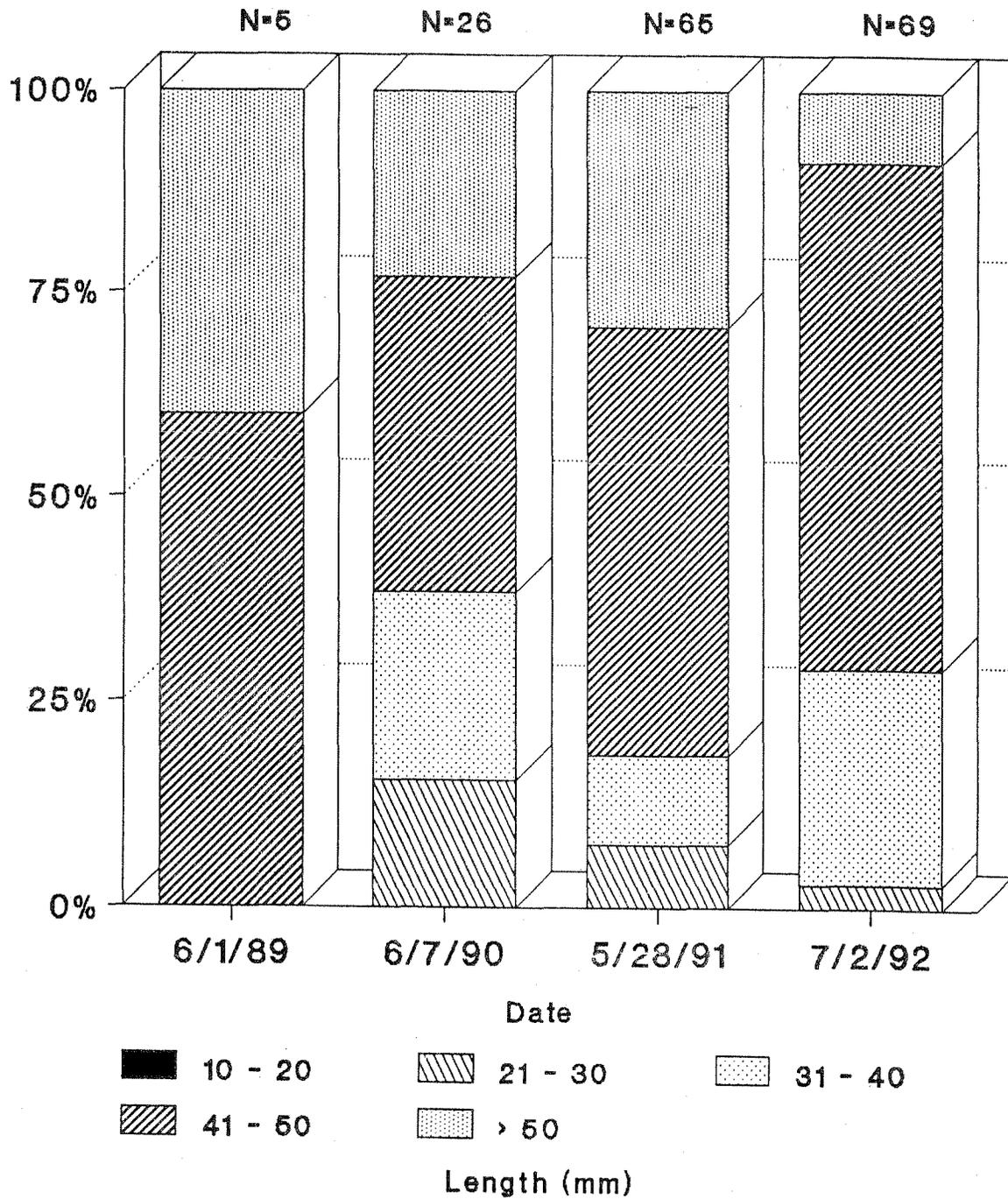


Fig. 3. Specimens from muskrat middens

Villosa constricta
Swift Cr., Nash Co., SR 1310 - 1003

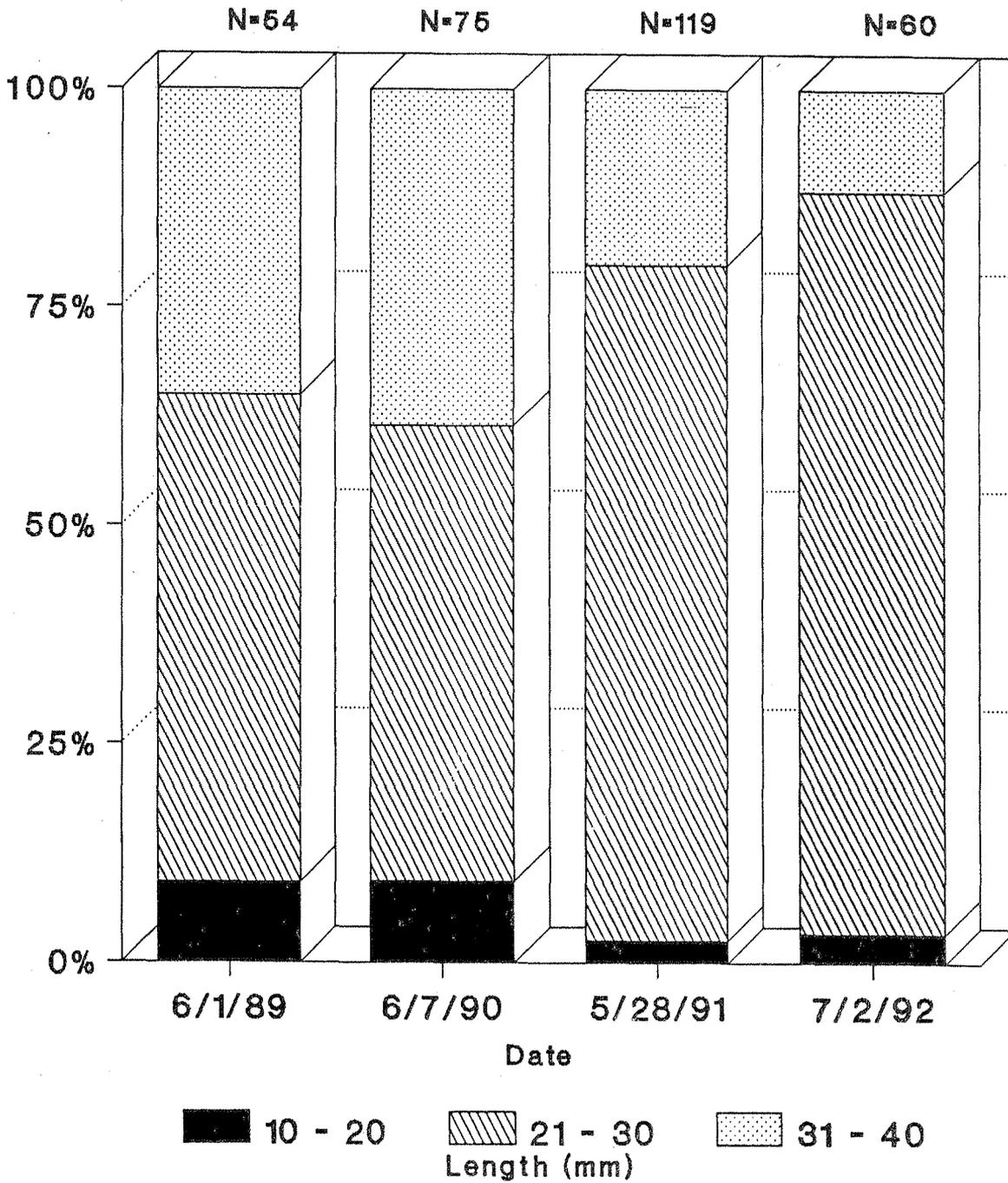


Fig. 4. Specimens from muskrat middens

Elliptio complanata + icterina
Swift Cr., Nash Co., SR 1310 - 1003

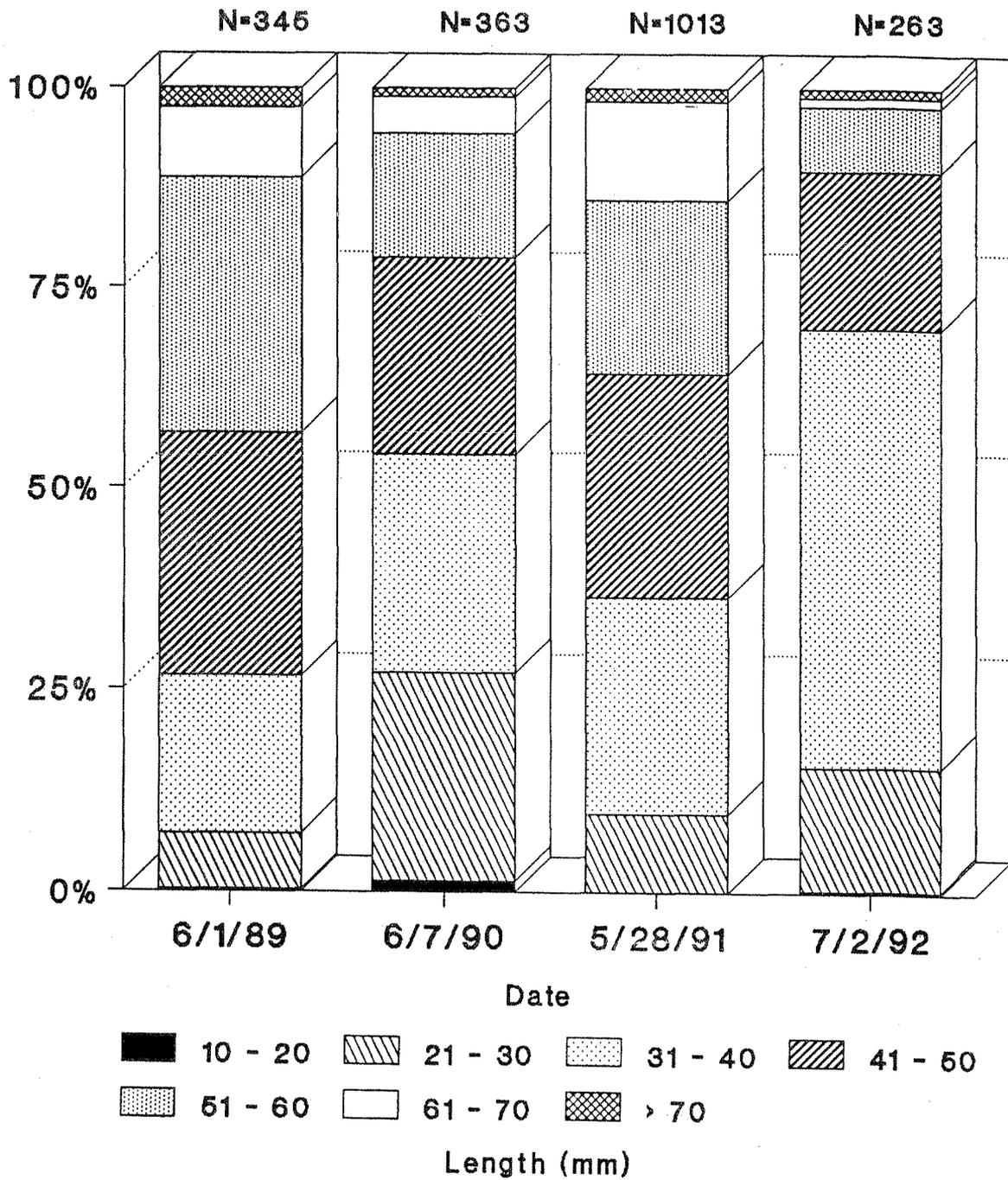


Fig. 5. Specimens from muskrat middens

Elliptio steinstansana
Swift Cr., Nash Co., SR 1003 - NC 48

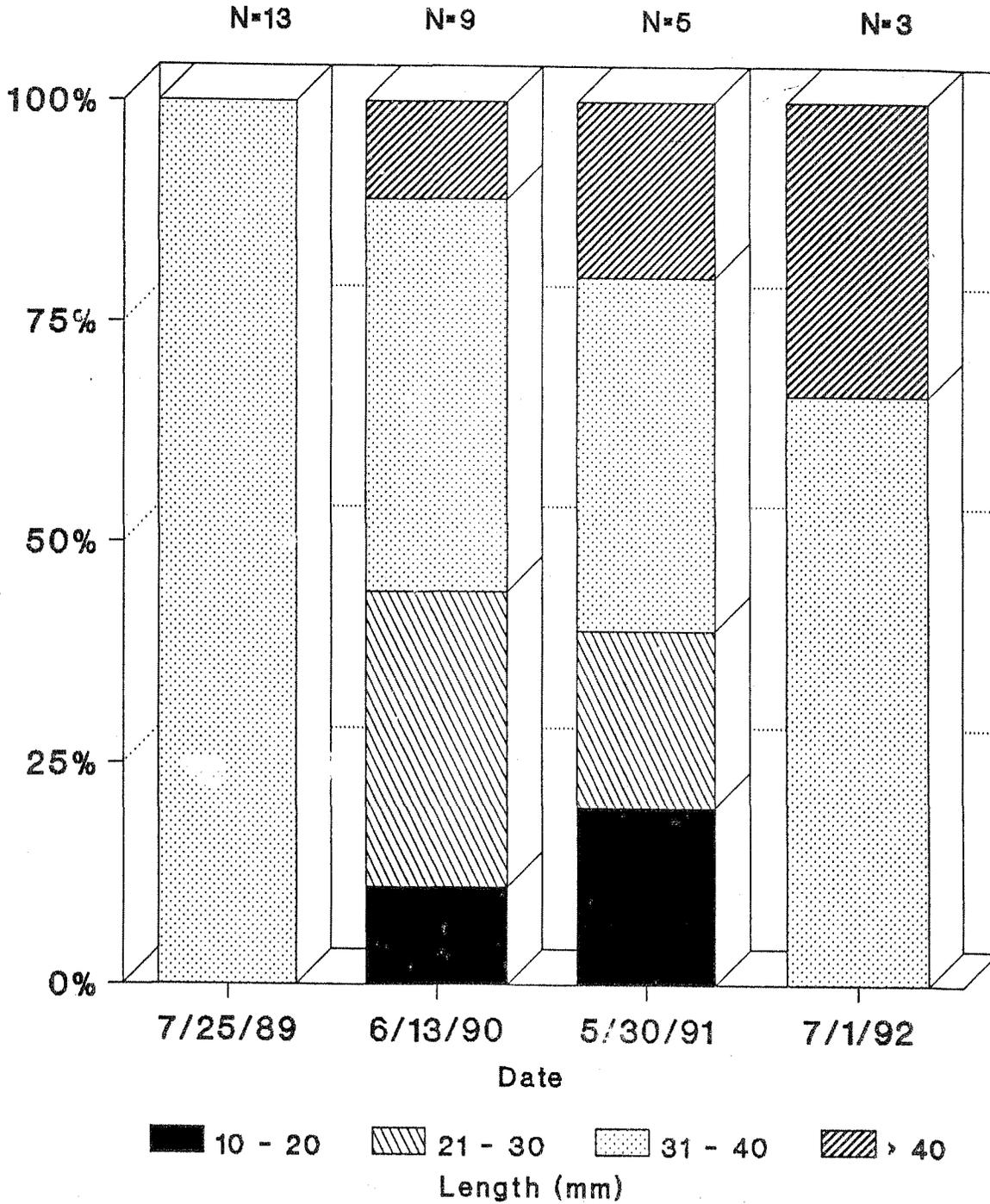


Figure 6. Specimens from muskrat middens

Fusconaia masoni
Swift Cr., Nash Co., SR 1003 - NC 48

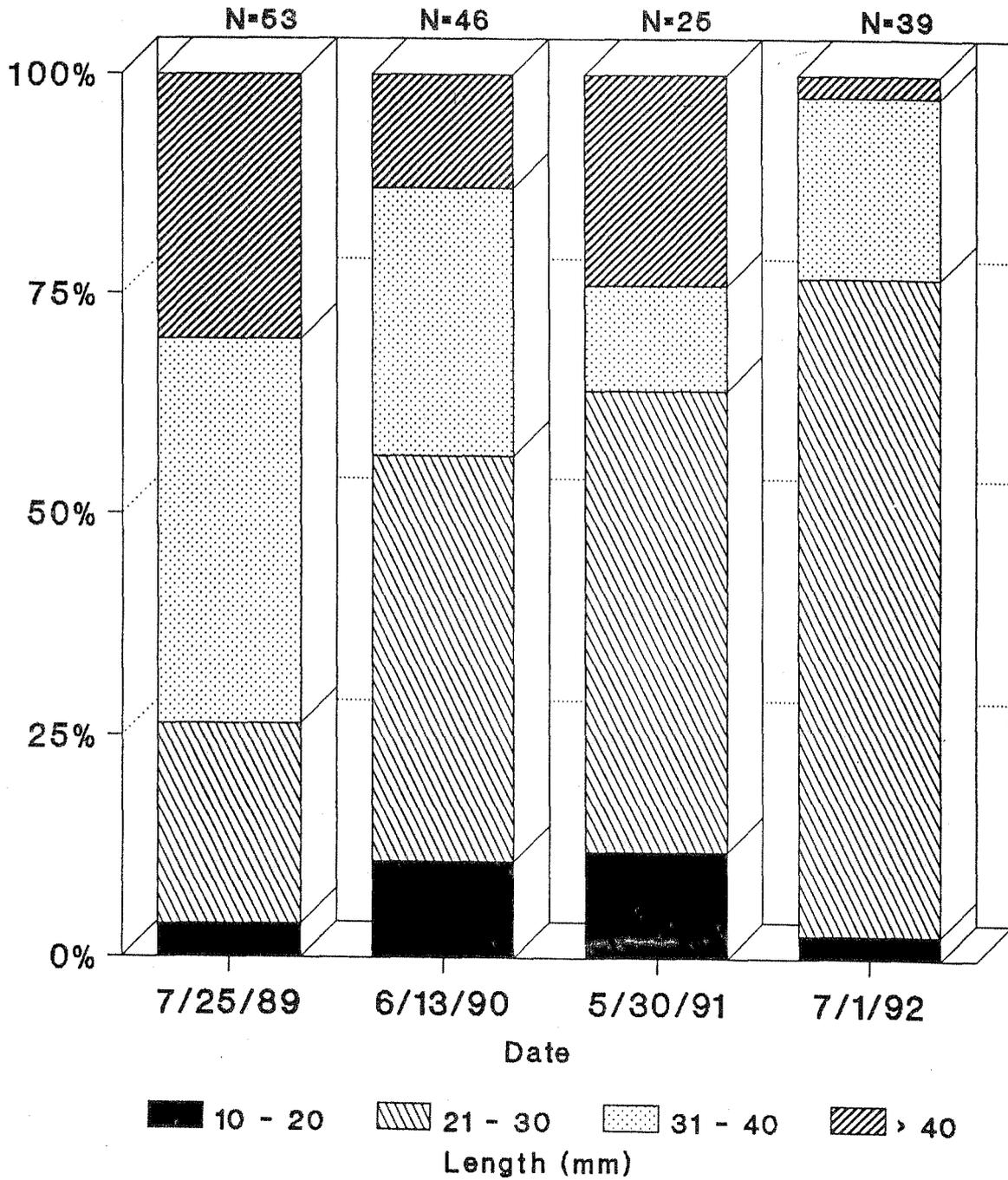


Fig. 7. Specimens from muskrat middens

Elliptio lanceolata
Swift Cr., Nash Co., SR 1003 - NC 48

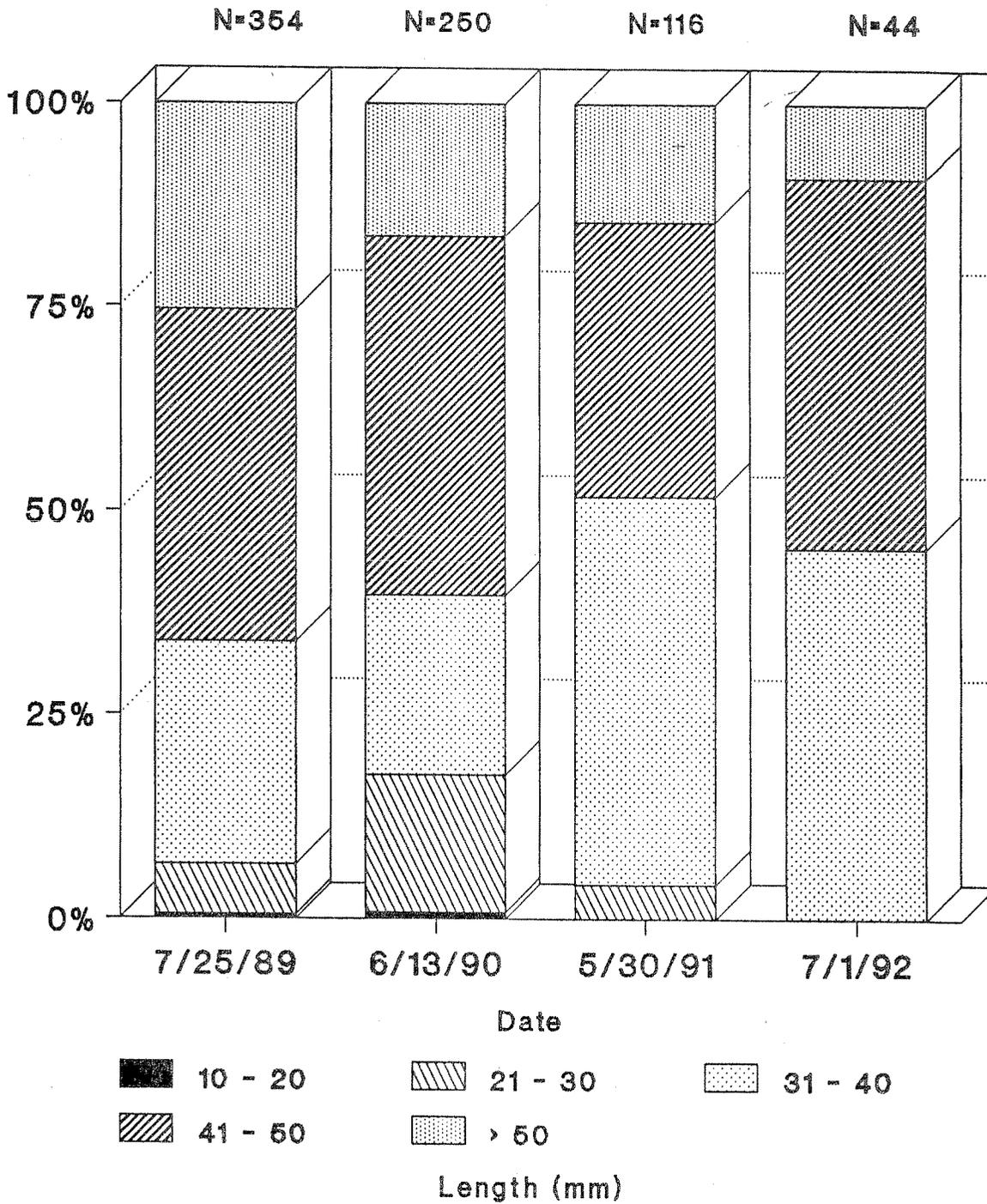


Figure 8. Specimens from muskrat midden

Villosa constricta
 Swift Cr., Nash Co., SR 1003 - NC 48

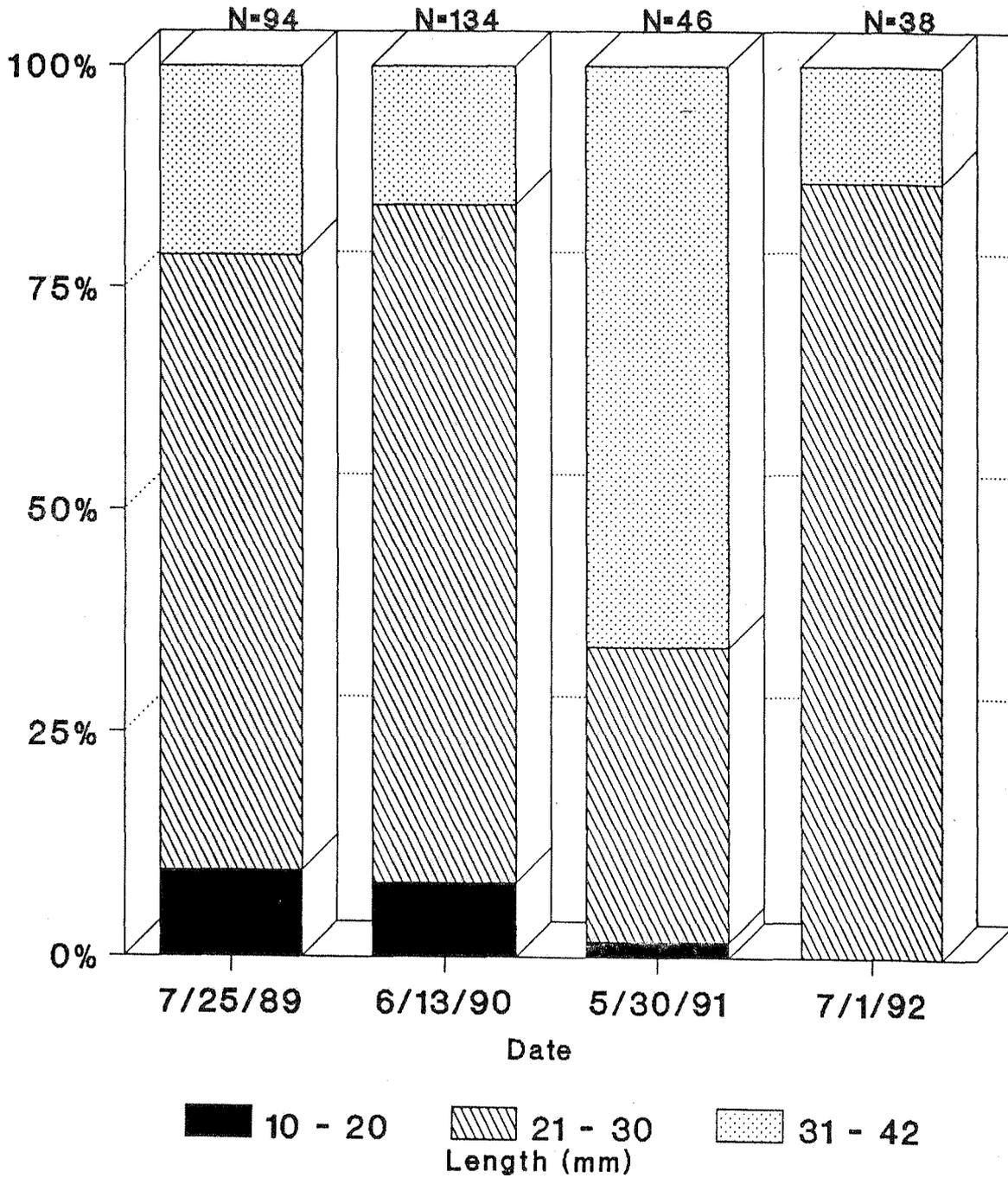


Figure 9. Specimens from muskrat midden

Elliptio complanata + icterina
Swift Cr., Nash Co., SR 1003 - NC 48

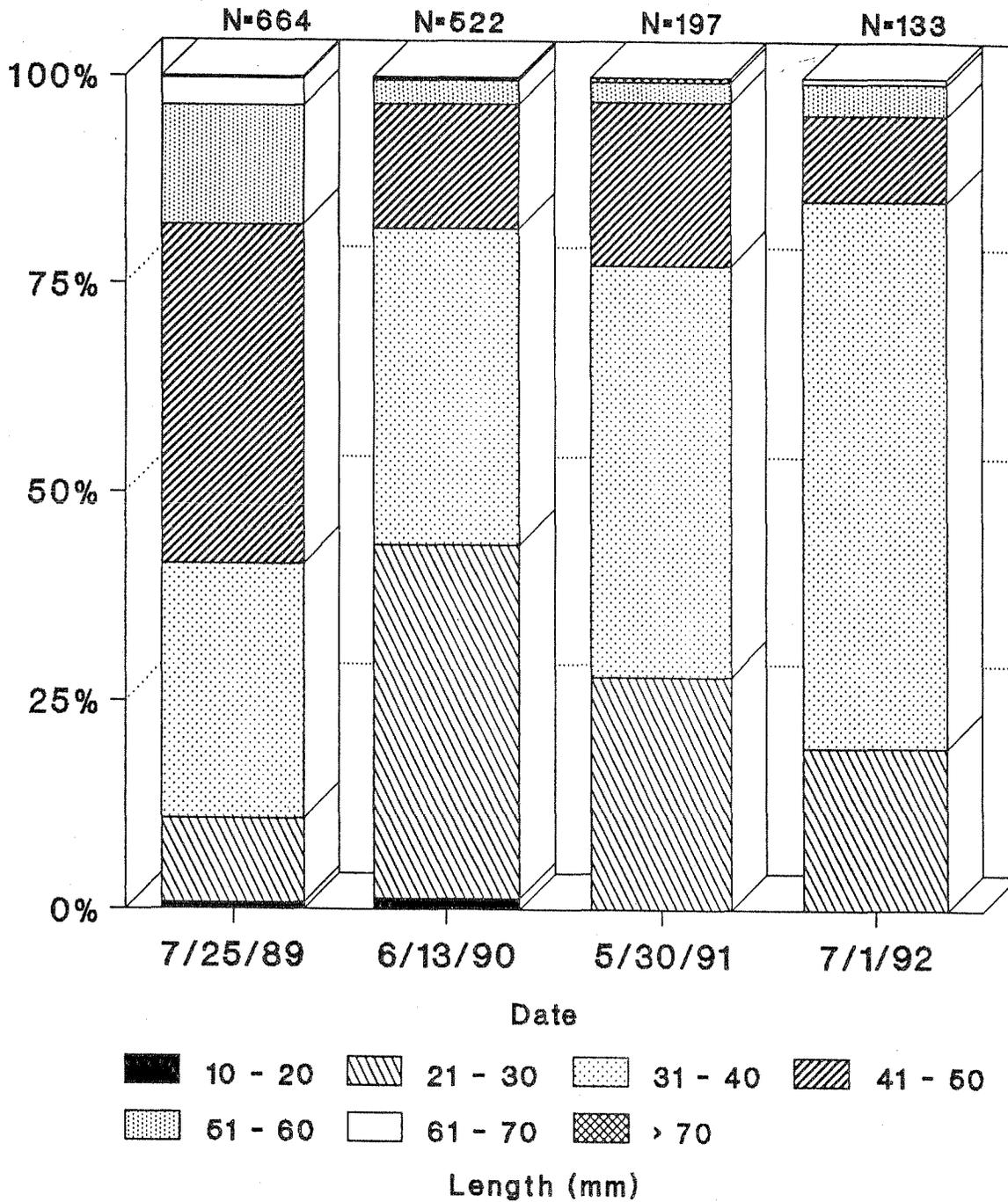


Fig. 10. Specimens from muskrat middens

1991 Tar River Spiny Mussel Substrate Fraction Percentages

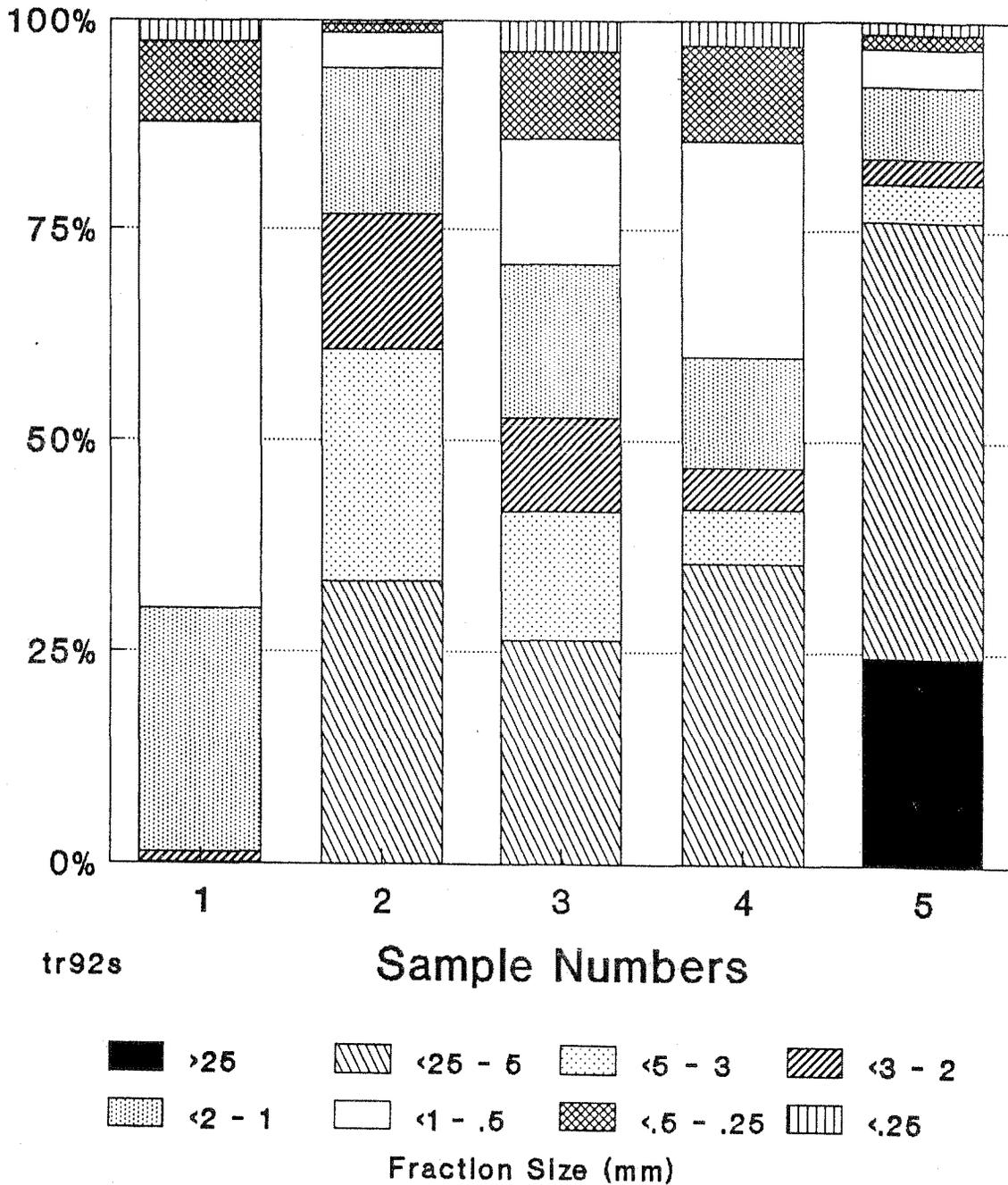


Fig. 11. Swift Cr., Nash Co., SR 1003-