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Evaluation of a Fin Ray Scarring Technique for Individually Marking Fish

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from a colony of *Eptesicus fuscus* in a home in Brinkley, Monroe County. For this record, specimens of the insect were collected from bats and captured by hand and from mist nets.

The authors have been conducting an extensive study of the chiropteran fauna of Southwestern Arkansas. To date the study has resulted in the collection of several hundred bats and *C. pilosellus* has been encountered on six occasions and at six new locations.

The first new record of this insect is from a well in Columbia Co., at an abandoned house site just north of the Louisiana-Arkansas border. Several bats were taken from the well by hand. Among these was a bat having two cimicides clinging to its uropatagium. In addition to the new county record, this find is notable because the bats were *Plecotus rafinesquii* and our review of the literature revealed no other report of *C. pilosellus* preying upon the eastern big-eared bat.

Bat bugs were next encountered in Sevier County. While mist netting over a rocky stream in a thickly wooded area near an open face rock quarry, sixteen bats were collected. Among the bats was an *Eptesicus fuscus* with two cimicides attached to its uropatagium. This collection was from a foraging bat substantiating that cimicides do not always remain behind in the roost when the bats leave. Additionally, these bats were collected from an area devoid of assessable human structures. All of our other records were associated in some way with human structures.

Our third new report is from Garland County. From a residence in Hot Springs, a mixed colony of *Tadarida brasiliensis* and *E. fuscus* was discovered. Although we observed many cimicides associated with the colony, they were invariably most intimately associated with *E. fuscus* rather than with *T. brasiliensis.*

The fourth new report was obtained from Calhoun County. The site was a recently demolished bridge over a shallow stream in a thickly wooded area. Of eight bats netted, one *P. rafinesquii* was found to have a cimicide attached to its right wing.

A house in Texarkana, Miller County yielded a fifth new record of *C. pilosellus.* A single cimicide was removed from the back of a *P. rafinesquii* (one of several in the house).

The most recent new record we report is from Lafayette County. From an area NE of McKamie, an additional *P. rafinesquii* was found having a cimicide attached to its uropatagium.

These six additional records of *C. pilosellus,* from scattered locations, indicate that the bats of southern Arkansas support a wide spread infestation of this ectoparasite. Interestingly, no single species is responsible for harboring *C. pilosellus* in Arkansas.

Voucher specimens from these studies have been deposited in the appropriate collections of Arkansas State University.

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EVALUATION OF A FIN RAY SCARRING TECHNIQUE FOR INDIVIDUALLY MARKING FISH

A mark for use on fish that is inexpensive, quickly applied, permanent, and permits individual identification has been needed by fisheries scientists and fish culturists for many years. A technique for marking fish that apparently meets all of the above criteria has been previously tested on several cold-water fish species under both laboratory and field conditions in Canada (Welch and Mills, Can. J. Fish. Aquat. Sci., 38:1168-1170, 1981). We report here the results of further tests conducted at both Sooner Fish Farm, a commercial catfish farm at Washington, Oklahoma, and at the University of Arkansas at Pine Bluff Agricultural Experiment Station, with two fish species used in warm water aquaculture.

The mark is created by severing a fin ray at about mid-length with fine-pointed scissors (Fig. 1). The ray should be completely severed but care should be taken not to tear the membrane between the rays, nor remove the distal portion of the severed ray. We are normally able to weigh, measure and mark a fish a minute with this method.

The severed ray mends completely in 4 to 6 weeks, forming a bony knot (Fig. 2) that is about twice the diameter of the ray. This mark is both easily seen and felt since it is larger than the rest of the ray (Fig. 3). The mark also appears darker than the rest of the ray when viewed with transmitted light.

Marks were produced in September, 1975, on the dorsal soft-rays of bigmouth buffalo *(Ictiobus cyprinellus),* averaging 2.2 kg, prior to stocking in a 1.6-ha commercial catfish culture pond. The marks were still obvious 18 months later when the pond was harvested (Fig. 3). Unfortunately, since we were unable to examine the entire population at that time, it could not be determined if some individuals had lost the mark.

The technique was subsequently used on both a dorsal soft-ray and spiny-ray of 225 blue tilapia *(Tilapia aurea),* averaging 195 g. There was 100% mark retention on the tilapia after 6 months, by which time the fish had grown to an average weight of 405 g. The marks on both the spiny-rays and soft-rays appeared equally visible (Fig. 4).

This technique is quick and easy to use, causes little trauma to the fish, and appears to be permanent, at least within the limits of this study. While the marks are visible upon examination, they would probably be overlooked by an untrained observer.

This technique can be extremely useful to fisheries scientists as well as fish culturists. While we have only applied marks to dorsal fin rays, this technique should work equally well on any fin, and on any fish species. A simple coding system using one or more marks on various soft-rays and/or spiny-rays can be used to batch mark groups, such as brood stock from different sources or age classes, as well as to mark individual fish. We have also used this technique for the short-term (< 1 month) marking of fish. While the knot obviously doesn't have time to completely form in this time, the severed ray itself serves to identify the fish. We found, as did Welch and Mills (1981) that the main disadvantage of this technique is the potential for error in counting the fin rays when marking or reading the marks.

General Notes

Figure 1. Dorsal fin of blue tilapia showing both a spiny-ray (left) and soft-ray (right) just after being severed (arrows).

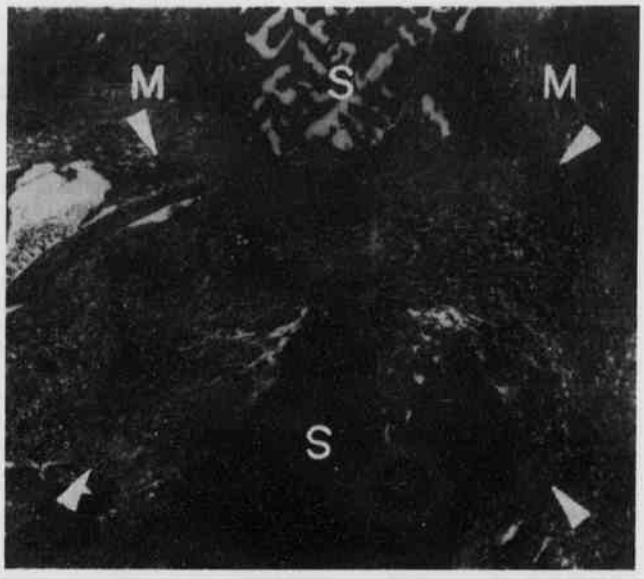

Figure 2. Medial histological section (H & E stained) through a dorsal spiny-ray of blue tilapia 10 days after being severed (arrows mark the approximate boundary of the knot being formed; S = spiny-ray; M = fin membrane).

Figure 3. Dorsal fin of bigmouth buffalo showing two marks (arrows) on soft-rays after 18 months of growth.

Figure 4. Dorsal fin of blue tilapia showing marks (arrows) on both a spiny-ray (left) and soft-ray (right) after 6 months of growth.

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