Usefulness of Microfiche Reader/Printer for Studying Fish Species

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USEFULNESS OF MICROFICHE READER/PRINTER FOR STUDYING FISH SCALES

Age assessment of fish is important in fisheries management because age data are used in estimations of growth, mortality and survival rates, and population structures. A variety of projectors have been used to study fish scales (Dauble and Gray, 1977; Phillips, 1974; Phillips and Webster, 1960; Wright and Kolb, 1970). When determining the age of fish by the scale method, the accuracy increases when there is agreement between two or more readers. It is, thus, desirable for the readers to analyse the same scale, and photographs of fish scales can make this possible.

A desk-top microfiche reader/printer (Minolta Reader/Printer RP 405) was used in analysing snakehead (Ophicephalus striatus) and largemouth bass (Micropterus salmoides) scales. For comparison, scale impressions on plastic slides and dry mounted or unmounted scales were placed between the glass plates of the microfiche film carrier. These glass plates flatten even a badly warped plastic slide or a fish scale, making it possible to obtain a focused image of the entire scale. The reader/printer has a wide range of interchangeable lenses providing a spectrum of magnifications useful for small to large fish scales.

The scale image can be projected, studied and measured from a vertical screen (30.5 x 30.5 cm), the brightness and sharpness being adjustable. Photographing the scales is a simple and fast procedure once a well focused scale image is projected, the polarity can be set at positive or negative, the exposure adjusted and the photocopy is made. The photocopy is returned within seconds and the brightness or exposure time can be adjusted and another copy made if the quality of the first copy is unsatisfactory. The cost of each photograph is minimal (ten cents per copy at the University of Arkansas).

Good quality photocopies were made for both snakehead, a tropical fish from Sri Lanka, and the largemouth bass from Crystal Lake, Arkansas (Figs. 1 and 2). The process of making plastic scale impressions is tedious and time consuming. Different size scales require different temperatures, pressing times or pressures. This makes it difficult to get a good impression and scales can be ruined in the process. Cleaned, dry mounted and unmounted scales can be used with the microfiche reader/printer and photocopies obtained as well (Figs. 1B and 2B).

The scales from older largemouth bass can be thicker in areas towards the foci. This makes it difficult to get even illumination across the dry mounted scale, though focusing is not a problem. It can be circumvented by taking two or more photocopies at different illumination settings and all the annuli can be identified. This procedure is certainly the least time consuming, however, good quality plastic impression slides of scales from an older fish are preferable so that all the annuli can be seen on one photocopy.

Many academic institutions and public libraries have microfiche reader/printers available. This instrument has many advantages over the conventional scale projectors. Plastic impression slides as well as dry mounted or unmounted scales can be viewed on the screen and photographed. The photographs and the microfiche reader both make it possible to compare a number of different scales for general patterns of annuli formation. In situations where multi-reader scale evaluation is warranted, specific photocopies could be used to insure that all the readers were evaluating the same scales.

We express our sincere appreciation to Jaya L. Kilambi for drawing our attention to the microfiche reader/printer and to Mr. Stephen J. Chism of the Audio-Visual Department of Mullins Library, University of Arkansas, for making the machine available to us when needed.

A. From plastic scale impression of a three-year-old (T. L. 256 mm) fish.
B. From dry mounted scale of a four-year-old (T. L. 310 mm) fish.

Figure 1. Photocopies of scales of snakehead from Sri Lanka.
A FOREST DATA BASE FOR ARKANSAS

The forest-derived resources of Arkansas form the largest single group of natural resources in the State. The timber, water, and wildlife of the forest form much of the basis for our wealth as a state. Our forests, directly or indirectly, provide Arkansas with recreational opportunities, jobs and many of the products that we need for shelter. The watersheds of our forests provide Arkansas with high quality water to maintain life, to irrigate our crops, for recreation and provide avenues for transportation. The economic importance of the forest sector has long been recognized. Estimates now place the combined influence of direct and indirect employment, services and commodities between one-quarter and one-third of the state's gross product on a yearly basis (Troutman, et al., 1981, Forests and the Arkansas Economy, Industrial Research and Extension Center, University of Arkansas).

Perhaps harder to measure, but also of significant importance, is the great diversity of ecological communities within the state. Many of these communities are populated with flora and fauna that exist nowhere else. The total quality of our lives are directly or indirectly influenced by these communities and the complex interrelationships that are characterized by them.

Because the forest comprises a majority of Arkansas' total land base (52%) (Quick and Hedlund, 1979, Forest Statistics for Arkansas Counties, Southern Forest Experiment Station, New Orleans, La.) and because it is a complex and dynamic biological community of flora and fauna, much of the basic scientific and ecological research that is carried out in the state is forest based. Much of the pure forest research that is conducted deals not just with individual tree biology, but with large scale mensuration and ecological information that includes stand and total forest descriptions. Additionally, much of the economic research in the state takes into account the contribution of the forest sector to the state's economy.

One problem that has existed for some time in Arkansas, especially for forest researchers, is the lack of available information on the total forest system of Arkansas. Often information must be garnered piecemeal from many sources with the inherent problems of data inconsistency being rife. Requests for data often must go unanswered, or information, clearly out of date, is supplied with apology.

In order to provide a consistent base of forest resource information to researchers and planners in the state, planning was initiated in January 1985 for a computerized forest data base. The original data base, as conceived, would have provided only information on the timber resources of Arkansas, the influence of the forest industry sector on the state's economy and generally be a storehouse of timber-related statistics. The response

LITERATURE CITED


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