Hello and welcome to this module. I am sheena paul teaching at Government college of Arts,Science and Commerce,Quepem. The name of the module today is Use of scales in classification and age determination of fish and modification of scales and fishes. This is module number 10. The outline of this module is modification of scales in fishes, use of scales in classification and use of scales in the determination of age of fish. As a part of the learning outcomes of this module the students will be able to describe the modifications of scales seen in different fishes, explain the use of scales in the classification of fish and understand the use of scales in the determination of age of fish.By and large in case of all groups of fishes, the body is completely covered by scales. However there are exceptions to this rule. Some fishes such as the catfish show a complete absence of scales on the surface of their body, in some forms scales are not visible externally, they are embedded deep inside the dermis region of the integument as in case of the eel. In the case of the porcupine fish Diodon, scales are modified to form spines which project outwards from the body. In case of the trunk fish Ostracion scales fuse to form a complete bony plate around the trunk of the body. In Sturgeon, scales are modified to form bony plates whereas in the case of Sharks, placoid scales get modified to form the teeth. In Sting rays the placoid scales get modified to form the sting whereas in the sawfish Pristis the placoid scales modify themselves to form the lateral teeth present on the rostrum. In case of the basking shark placoid scales get modified to form gill rakers which are present on the inner surface of the gill arches. Scales are modified to form bony rings in Hippocampus that's a seahorse and in Syngnathus that's flute fish. Use of scales in classification: The structure of the scales can be used in the broad classification of fishes. For example the placoid scales are seen only in Chondrichthyes, ganoid scales are seen in the primitive bony fishes whereas the cycloid and ctenoid scales are seen only in case of the modern day teleost fishes. Scales can also be used in the separation of orders and families. Siluridae which are without scales can be distinguished from the ciprinoids. Scale counts along the lateral line and around the body are also used in classification. Scales provide an important source of information on fossil fishes. They are also used in the study of food habits of fishes. Use of scales and determination of age of fish. There are many ways to determine the age of fish. One of them is the study of scales. Scales from the dorsal ventral and caudal region of the body along with the scales of the lateral line are used in the study of age determination of fish. Scales show a certain pattern of sculpturing on its surface which can be used for the determination of the age of fish. Each scale shows the following parts on a surface. there is the presence of a small clear central area called as the focus which in some scales may be displaced from the center due to the unequal growth of the anterior and posterior part of the scale. Surrounding the focus are concentric lines which run parallel to one another at regular intervals. These concentric lines are called circuli. They appear as ridges on the scale. Grooves are present in between two consecutive circuli which are depressions present between them and are responsible for the regular spacings between the circular grooves and circuli are marks of growth activity. Large number of circular and grooves are formed in one year. Growth rate of the fish is not constant throughout the year. There are seasonal fluctuations which are seen during the summer months when there is abundant food supply, there is rapid growth of body as well as the scale whereas during the winter months, growth slows down due to scarcity of food and temperature dependent metabolic activities. The widely separated lines of growth or circuli indicate periods of rapid growth of the body of the fish whereas close lines represent slow growth periods. A series of widely separated lines and close lines or circuli correspond to a year in the life of a fish. Radii are grooves which occur radially from the margin of the scale towards the focus.They cut across the circuli. The last type of marks which are seen on the surface of the scale are the annuli. They are represented as wide circular troughs. They serve as year marks on the scale of the fish and the number of annuli represent the age in years of the fish. They are periods of slow growth in a year and are systematically laid out one in each year. As the fish grows, in between the annuli there may be the presence of incomplete narrow closely spaced circuli. Scales can also be used to estimate the number of spawnings in fishes. Spawning marks are seen on the scales in case of salmons, which live their life in marine waters but for the purpose of spawning, they journey back to the freshwater bodies. During this anadromous journey for spawning, no feeding takes place. Due to a calcium deficiency during this fasting period in case of salmon the margin of the scales get eroded leaving spawning marks spawning marks. They can indicate the number of times the fish has undergone spawning. These are the references that I have used in the making of this module. Thank you