Hello and once again welcome to the program of Bachelor of Science.First year subject botany semester II course Code BOC 102 and course title. Biodiversity II vascular plants. title of the unit is Unit 2: Gymnosperm ,module name.Classification of Gymnosperm by Coulter and Chamberlain in this module.

I'm going to explain the classification of gymnosperm given by Coulter and Chamberlain.At the end of this e- module student classifies gymnosperm, they memorize the classification of gymnosperms illustrates the classification and explains different characteristics of class and order of gymnosperms given by Coulter and Chamberlain.Chamberlain in the year 1917 divided

gymnosperm directly into seven orders.They are cycadofilicales,Bennetitales,cycadales,Cordaitales, ginkgoales, coniferales and. gnetales. In the year 1934.Chamberlain classified Gymnosperms broadly into two groups.Class cycadophyta and class coniferophyta.Further, these groups or classes were classifiedintosevenorders.TheywereCycadofilicales,Bennettitales,Cycadales,cordaitales,Ginkgoales,conif erales and Gnetales. class cycadophyta is classified into three orders,namely order cycadofilicales,order cycadeoidales.and order cycadales.The plants which are belonging to the class cycadophyta,they're always unbranched with Stumpy stem.That is,the branches are absent and the stem is short and stout. The leaves that are present are large,pinnately compound or leaf divided.i.e,it will show a central axis called as rachis and on either side of the rachis leaflets are present.The reproduction is with the help of the cones i.e the male cones are large. They are very much compact with the simple sporophylls,whereas the female cones are loose and they consist of the simple sporophylls,which in turn bears large ovules which are naked.That is they are not enclosed inside the ovary.Now coming to the order cycadofilicales of class cycadophyta.The plants which belong to this order they are extinct.They were generally the trees or the small plants with fern like leaves.Sporangia borne on frond like leave, cones are absent .coming to order cycadeoidales.The trees are with the stem covered with persistent leaf bases.The male and the female sporophylls are present.The male sporophylls are frond like forming loose crown whereas the female sporophylls form cone like structure.Order cycadales.These plants are the trees , woody in nature,with unbranched stem that is,stem branches are absent.The stem is always rough due to the presence of persistent leaf bases.These trees they show pinnately compound leaves which are always arranged in whorls at the apex of the stem.The leaflets are with the single Midrib and the lateral veins are absent.The wood that is present is manoxylic means the wood is not compact with less amount of Xylem tracheids.The micro and the Megasporophyllsare formed and they are arranged ina compact manner to form a structure called as strobili or the cones.They may be lateral or terminal on the stem.The pollination in these trees belonging to the order cycadeodales is anemophilous that is wind pollination and fertilization is siphonogamous, that is,it is with the help of the Pollen tube.Now coming to the Class coniferophyta,This class is further divided into 4 orders,namely order cordaitales,order ginkgoales, order, coniferales, an order gnetales.Now the characteristics of the class coniferophyta,the trees which belong to this class.They have the stem which is profusely branched and.the foliage always gives the cone like appearance.The leaves which are present.are dimorphic in nature.The reproduction is always with the help of Male and the female strobili which pay the complex sporophyll. What is pcynoxylic wood?The wood is compact and it shows large amount of Xylem tracheids class coniferophyta is divided into the order cordaitales The characteristics are the large trees with flat strap shaped leaves.Fructification is in the form of cones.The next order is ginkgoales. The trees belonging to this order medium size trees, The leaves are flat and lobed and the lobed leaves show the dichotomous venation.The male and female flowers are present,but in the form of strobili. Coming to the order coniferales.The examples of coniferales

are *Pinus Auraucaria, Thuja, podocarpus*.The plants which are belonging to this order are usually tall,they profusely branched that is are they are much branched ,Evergreen.i.e,they remains green throughout the year..The branches are dimorphic in nature.i.e two types of branches are present, branches of limited growth and branches of unlimited growth.The branches of limited growth are called as the dwarf shoots,whereas the branches of the unlimited growth are called as the long shoots.The leaves in case of these plants. They are needle like,linear or lanceolate, and scaly or broad.Now coming to the last order of the Class coniferophyta.The plants or the trees which belong to this order,.they are the small trees or shrubs or climbing shrubs,and the very best example of the plant belonging to this order is Gnetum. This particular plant shows some similarity with the angiospermic plants,stem with opposite leaves the compound male and female cones are present.

These are the references for this module. Thank you.