

Hello Students I welcome you all to the program S.Y.BSc. Subject Botany Semester 3, Course code BOC One Zero Three, Course title plant anatomy and Embryology. Unit 5, structural organization of Flower module name structure and types of ovules. I am Dr. Suraksha Dongrekar assistant professor at St. Xavier's College, Mapusa- Goa. Outline Structure of Ovule, different types of Ovules. Learning outcomes defines ovule, explains structure of ovule and Explains different types of ovules. Students you have already seen a flower. When we define a flower, it is a Reproductive structure found in flowering plants. The function of a flower is to facilitate reproduction, usually by providing a mechanism for the union of sperm with eggs. Typical flower has four main parts; we also call it as whorls. The first whorl is sepals which is an individual member of calyx. The combination of sepals together is called as calyx, and the main function of the calyx is to protect the flower in bud condition. Second Whorl is petals. Petal is the individual member. All petals together form the Corolla. Petals they attract pollinators to carry out the process of pollination. The third whorl is the stamens, is the individual member, all stamens together is called as Androecium and it is the male reproductive structure of the flower. The 4th and the last whorl is the pistil or Carpel single or the individual member. All pistils together they are called as Gynoecium and it is the female reproductive structure of the flower. In this presentation we are going to study about the female reproductive structure that is pistil the last and the innermost whorl of the flower. As I said it is the female reproductive part of the flower. When there is only one pistil present we call it as a monocarpellary and when there are more than one pistils we call it as multicarpellary. When there are more than one Pistils, may be fused together (Syncarpous) or they may be are free as you can see in the picture marked figure B (Apocarpous). Now each pistil has three main parts as you can see in the picture, the stigma style and ovary. Stigma is a landing place for pollen grains. So here during the pollination, pollen grain will come and get adhere to the stigma surface. Second is the style is a tube through which the pollen grain reaches the ovary, and the third part is the ovary. Ovary contains ovules, and these ovules intern develops into seed and ovary into fruit. Now ovules cannot be seen when they are present inside,

So you need to take the LS of the pistil. That is the longitudinal section of the pistil. So when you take the LS. You will find these ovules are present inside the locules or we also called it as a carpel. So as you can see in the picture when there are two carpels present or two locules are present we call it as a bicarpillary and in the center. These ovules are attached to a tissue or to a mass of cells. The yellow colored mass which is marked here it is called as the placenta. Now coming to the structure of the Ovule. Ovule is present inside the ovary. We commonly called it as a megasporangium. Ovule is a small structure and it is attached to the placenta by means of a stalk as you can see in this picture, called as the funiculus. Now the body of this ovule is attached to this stalk at particular region and that region is called as the hilum. Each ovule has one or two protective envelopes which are called as integuments. As you can see in this particular picture, these are the two protective layers which are surrounding the central mass,so they are called as the integuments. So these integuments can be one layer or it can be two layers. When there are two layers we call it as unitegmic, and if two layers bitegmic. Then these integuments they encircle the ovule accepted one particular point where the small opening is present. As you can see in this picture, this opening is called as the micropyle. Now opposite to this micropyle end is the chalaza representing the basal part of the ovule. So this topmost portion of the ovule that is the basal part of the ovule is called as the chalaza. Then inside the ovule present a parenchymatous tissue

In the centre called as nucellus. The cells which are meristematic and have the ability to divide and redivide. Inside the nucellus there is an embryo sac which is called as the female gametophyte. So this is about the structure of the ovule. Now coming to the types of the ovules. In relation with the position of micropyle, funiculus and chalaza ovules are basically divided into six types. The first one is the orthotropous or Atropous ovule. Ortho means straight and topous means turn. So as you can see in this picture, the body of the ovule is erect or straight and the hilum, chalaza, funicle and the micropyle they all lie in one straight line. Examples of the families like Piperaceae, Polygonaceae. The second type is called Anatropous ovule ana means backward or up and tropous means turn. As you can see in this picture, the body of the ovule becomes completely inverted during the development so that the micropyle and the hilum. They lie very close each other and this ovule is the most common type of ovule and it is found in all the angiosperms. Third is the Hemi-anatropous or hemitropous ovule. If you see in the picture the body of the ovule is present transversely at right angle to the funicle. The micropyle and the chalaza they lie in one straight line. This is usually observed in the family Ranunculaceae. Next is Campylotropous ovule Kamylos means curved so as you can see in the picture, the body of ovule is curved or it is bent round so that the micropyle end and the chalaza they will not lie in the same straight line. This type of ovule is mostly common in the family Fabaceae. The fifth type is Amphitropous ovule so here as in the picture the curvature of the ovule is very much pronounced and the embryo SAC also becomes curved. Embryo SAC is also curved, or we call it as a horseshoe shaped embryo SAC. So it is usually found in the families like Alismaceae, and Butomaceae. The last type is the Circinotropous ovule. Here the nucellus and the axis are in the same line in the beginning, but due to the rapid growth on the one side, the Ovule becomes an anatropous. The curvature continues further and the micropyle again points the upward direction. So generally this ovule is found in the families samples like Opuntia and Plumbago. So students, this is about the structure of the ovule, which is female reproductive structure and the different types of the ovules. Finally here are some of the references. Thank you.