**Order 4: peronosporales**

**important characteristics of this order:**

1. Considered most developed in Division Oomycota and the most important order for humans because of the parasitism of its members on the plants, causing Economic losses.
2. Cause plant diseases such as **white rust** and **downey mildew** .
3. All its members obligated parasitism .
4. Mycelium non septet, grow either intercellular or intera cellular**.**
5. Asexual reproduction by forming zoospore Binary flagella, Kidney shape , Flagella get out through the concavity region .
6. The shape of sporangiophore is club , There are arranged vertically under the epidermis of host plant .
7. Sporangio in the appropriate environmental conditions are divided into many **spores** Possible to germinate and occur a new infections.
8. Sporangio in the inappropriate environmental conditions behave **conidia** occur a new infections.
9. This order have many families divided according to
10. presence sporangio within the host.
11. shape and regularity asexual units on sporangiophore.

**Family 1- : pythiaceae :**

 grow continuously for sporangio on single thread (hypha).

**G1** **: *pythium debaryanum*** ( damping of seeding )

**Asexual reproduction :** sporangio are circular carry on the thin stalk like hypha, not release zoospore directly, but forming tube at the end of the tube forming vesicle have all the contents of sporangio than forming zoospore and when release loses flagella and becomes kidney shape than spores germinate forming a new hypha .

**Sexual reproduction:** fertilization between male gametes (Anthridium ) and female gametes (oogonia) forming **Oospore** which germination to a new hypha when temperatures are high , But if temperatures have decreased forming vesicle and release zoospore and germination to a new hypha.

**G 2**: ***phytophthora infestans*** (late blight of potato )

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| --- | --- |
| ***Phytophthora*** | ***Pythium*** |
| 1- | Shape the sporangio are lemon | Shape the sporangio are circular |
| 2- | Zoospore release from papilla | Zoospore release from vesicle  |
| 3- | Sporangiophore are clearly  | Sporangiophore are Thin |
| 4- | Anthridium arise from base oogonium  | Anthridium be side-Site |

**Family 2- : albuginaceae**

1. All its members obligated parasitism .
2. Cause plant diseases such as **white rust** (White pustules glossy on Plants leaves ).
3. The shape of sporangiophore is club .

G : ***Albugo candida***

Infects members of Family Cruciferae .

**Family 3-: peronosporaceae**

1. Membersobligated parasitism on many economic plants .
2. Cause plant diseases such as **downey mildew(**Disease symptoms appear shaped yellowing spots on the upper surface of the leaves.
3. sporangiophore are clearly and branches.

**G 1- *Peronospora destractor* ----** infects onions and tobacco, Binary Branches with acute angle in endes carry sporangio.

**G 2- *Plasmopora viticola*  --------** infects grapes , The ends of the branches there is a small bump called **sterigma** carry sporangio .

**G 3- *Bremia lectucae* --------------** infects lettuce**,** The ends of the branches have 3-4 sterigma carry sporangio .