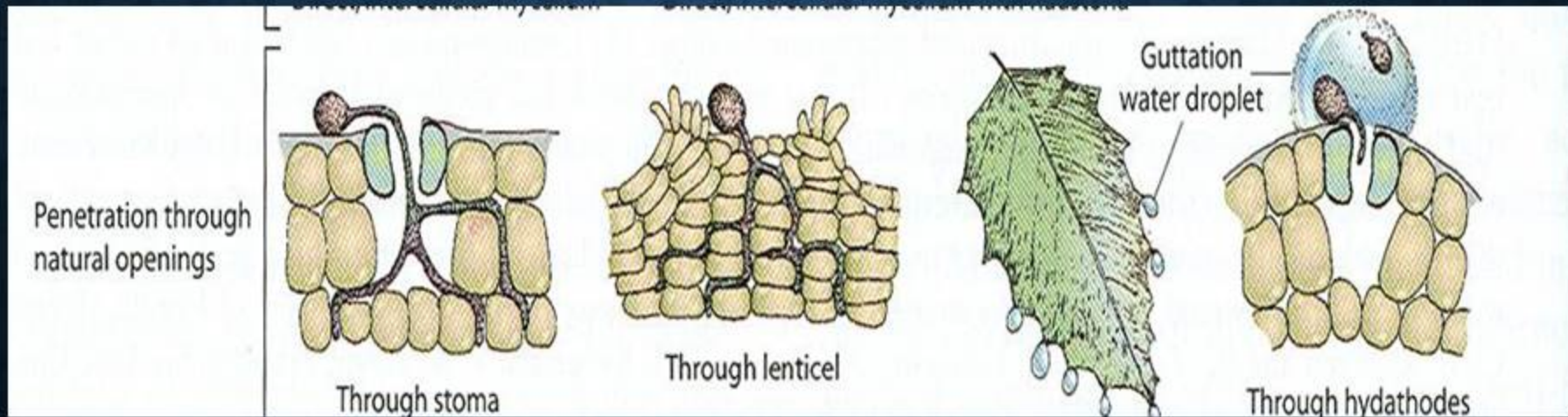


PENETRATION PROCESS - INDIRECT

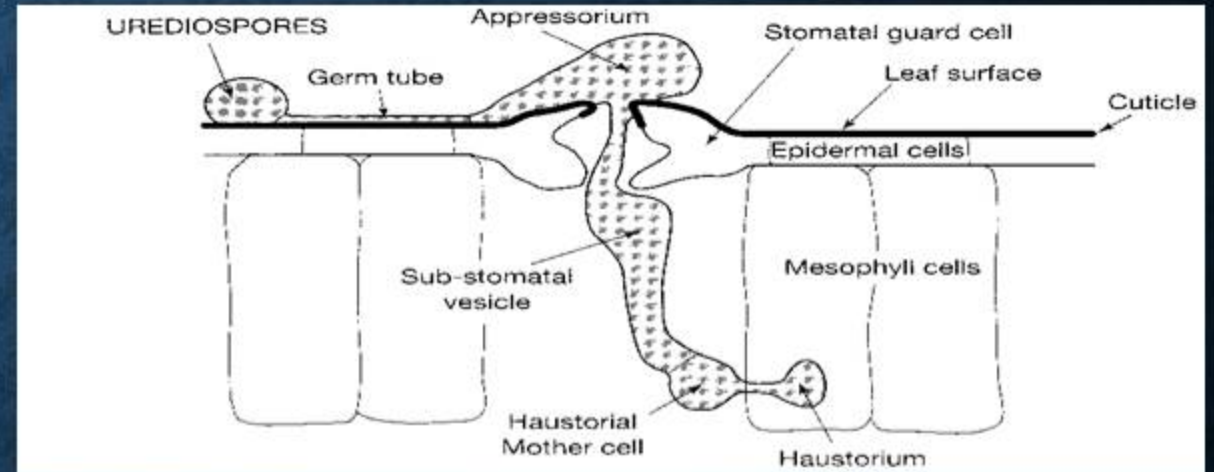
2. Indirect Penetration:

- a) Stomata
- b) Lenticels
- c) Hydathodes



PENETRATION PROCESS - INDIRECT

- **Stomatal Penetration**
- Some fungal and bacterial pathogens
- Penetration depends upon:
 - Size of stomata, Number of stomata, Location, Time of opening / closing of stomata
- Majority of the fungi produces appressorium
- Stomatal invaders includes:
 - Peronosporales (downy mildews)
 - Ustilaginales (smuts) & Uredinales (rusts).



PENETRATION PROCESS - INDIRECT

- Fungal stomatal Penetration:
- *Uromyces appendiculatus*, Bean rust

