

# Rust of Pea

**Pathogen:** *Uromyces fabae* (Pers.) de Bary

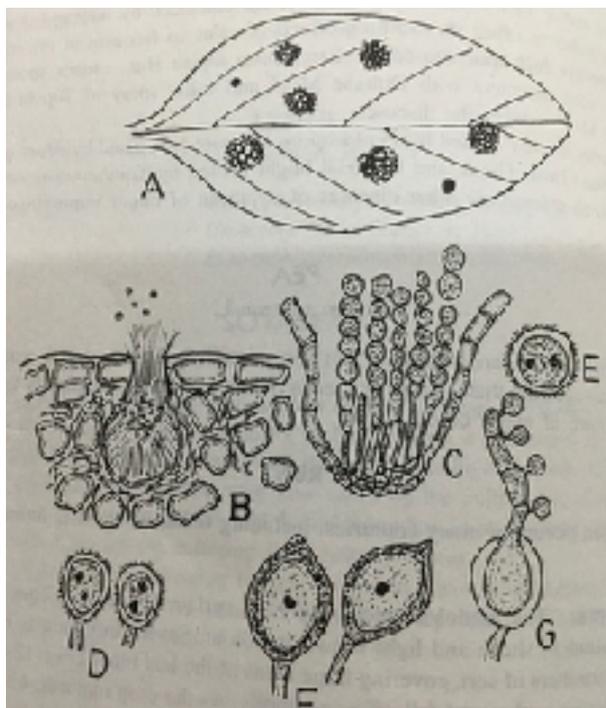
**Taxonomic Position of Pathogen:** Subdivision: Basidiomycotina; Class: Teliomycetes; Order: Uredinales; Family: Pucciniaceae

**Distribution and Importance:** Pea rust is of worldwide occurrence and attacks number of host species belonging to genera of the family leguminosae in the Indo-Gangetic plains. It also occurs in lentil crop. Two species of *Uromyces* occur on cultivated peas (*Pisum sativum*) *Uromyces pisi* (Pers.) Wint. is a heteroecious species having its aecial stage on *Euphorbia cyparissias* and is not common in *Bharat*. The other species *Uromyces fabae* is autoecious and most common rust of pea in North *Bharat*. In north-west Uttar Pradesh the rust causes severe deformity of stems and necrosis, and often death of the plants.

**Symptoms:** The earliest symptom, is the development of Aecia in round or elongated clusters, in February or even later. Pycnia are infrequent or rather inconspicuous. All the spore stages develop on every green part of the host including pods. The formation of aecial stage is preceded by a slight yellowing which gradually turns brown. The uredial pustules develop on both surfaces of the leaves as well as on other parts of plant. They present the powdery, light brown appearance. As the crop matures, telia occur in the same sorus as the uredia and develop from the same mycelium. They are formed on leaves but most commonly on stems and petioles. They are dark brown or almost black thinly distributed on the plant parts.



**The Pathogen:** The rust is autoecious, completing its life cycle on pea. The aecia appear first on lower surface of the leaves and on the stems and petioles, where the pycnia also occur mixed with aecia. The peridium of the aecium in *Uromyces fabae* is short, whitish, and cup shaped. The Aeciospores are round to angular or elliptical, yellow in colour and possess fine warts. They measure 14-22  $\mu\text{m}$  in diameter. The uredial stage which is repeated several times during the season, produces spiny light brown urediospores with 3-4 germ pores, and measure 20-30 x 18-26  $\mu\text{m}$ . The teliospores are subglobose, ovate, or elliptical, with rounded or flattened apex, single celled and pedicellate (up to 90  $\mu\text{m}$  long stalk), which is considerably thickened and appears papillate. These spores are smooth, brown and measure 25-38 x 18-27  $\mu\text{m}$ . The teliospores germinate to produce four celled basidia on which four sporidia are formed.



A: Pustules on leaf, B: Pycnium, C: Aecium, D: Urediospores, E: Aeciospores, F: Teliospores, G: Germination of teliospores

**Disease Cycle:** The pathogen survive via teleutospores present on diseased plant debris or mixed with seed. These survive in high temperature of summer in plains of our country and remain viable till the next crop season. Teliospores are germinate and four uninucleate basidiospore are produce. These basidiospores are infect of pea crop and form the pycnia, from which produce pycniospores. These pycniospores infect in crop to induce aecium stage. Cup shaped aecium produces on lower side of the old leaves from which aeciospores are released. These aeciospores are disseminated by air and induced the secondary aecium in leaves and other plant parts. Infection at relatively low temperatures of 17<sup>o</sup> to 22<sup>o</sup> C results in formation of secondary aecia, while at 25<sup>o</sup> C the infection causes development of uredia. The aeciospores do not survive at 30<sup>o</sup> C. Whereas next stage develop in pea as Uredia which release the urediospores, these spores are continuous disseminate and cause infection in pea crop. At maturity of the crops, next stage is develop as **telial** from which pedicellate teliospores are produces. These spores are survive on infected plant debris and other hosts as broad bean, lentil, sweet pea and Lathyrus in off season. Since several of these crops are grown the year round, the fungus may multiply freely and pass from season to season without difficulty. Thus, disease cycle of pea rust is completed.

### **Management:**

1. Field sanitations to destroy the crop debris is very important for reducing losses from pea rust.
2. Use of resistant varieties.
3. Follow long crop rotation, avoiding broad bean, *Vicia faba*, *Lathyrus*, etc.
4. Use of clean, contaminate-free seed and seed treatment can also be done with Thiram.
5. Sprays of fungicides like Mancozeb (0.2%), Bayleton (0.05%) and Calixin (0.2%). First spray is given as soon as disease detected in the field and three more sprays are given at 10 days intervals. Three sprays of Tridemorph, Chlorothalonil, Zineb and Mancozeb have provided good control of pea rust.