

# **DISEASES OF JUGLANS REGIA LINN.**

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*Juglans regia* is a large deciduous tree with imparipinnate leaves. The wood is even grained and is greyish-brown with dark brown streaks. It attains an height of 80-100' or even more. It has a wide natural range of distribution and is found in pure as well as in mixed form. In wild state it is found usually from 5000' to 10,000' and in cultivated form it is found from 3,500' to 10,000'. It occurs chiefly on deep well drained and fertile soil on sheltered situations such as moist ravines or depressions. Pure crops are found on lower gentle slopes of well drained depressions the parts of which are occupied by coniferous forests. (6) It is also found mixed with horse chestnut, maple, oak, bird cherry or with conifers particularly spruce, fir and blue pine In west Pakistan it is commonly found in Hazara, Murree, Swat, Dir, Chitral, Gilgit and Baltistan.

The timber of walnut is moderately hard even, grained. Sapwood is greyish-white and heartwood is brown with darker streaks. It is very durable, works well and does not warp or split. It is used for furniture, cabinet making, carving and for gun-stocks. It is found to be the best wood for gun-stocks so there is always a demand for it. The tree is often cultivated for its valuable fruit. Wild trees are lopped for fodder. Spirit is extracted from leaves which is used in checking the sickness of pregnancy. Bark is used to clean the teeth and strengthen the gums. It is also used as an astringent, anthelmintic and lactifuge. Outer bark is used as a dye in Kashmir. An oil is extracted from the fruit which is used internally as a teanicide especially for tapeworms and is a mild laxative. Externally it is used in in case of dimness of vision. (4)

During the survey of Diseases of Conifers and Selected Hardwoods special attention was given to the diseases of *Juglans regia* keeping in view its importance and valuable properties. The following diseases were found. Of these Trunk Rot was found to be more serious.



## 1. White mottled Rot.

Causal Organism:—

*Fomes fomentarius* (L. ex. Fr) Kick.

(Polyporaceae-Basidiomycetes)

This fungus has a wide range of hosts but it is most commonly found on this tree causing severe damage. It attacks living trees and is also found on dead stumps.

The fungus gains entry through the wounds caused by lopping and other injuries. The incipient stage of decay shows brownish colour. Later on wood becomes yellowish white, soft and spongy with narrow dark-brown to black lines changing hard and durable wood into spongy and mottled mass. The fungus attacks sapwood as well as heart wood.

Sporophore is hard, perennial, hoof shaped, variable in size and usually 8-30 cms. wide or even larger in size. Upper surface is grayish-black to grayish-brown and is glabrous with thick horny and zoned crust. Margins are thick and obtuse. Pore surface is grayish to brown. Pores are rounded. Context is bright-yellow or reddish-brown, soft and punky. Spores are hyaline, smooth, cylindric to ellipsoid, 12 to 15  $\times$  4-5  $\mu$ .

## 2. White Spongy Rot

Causal Organism:—

*Inonotus hispidus* (Bull ex Fr.) Karst.Syn. *Polyporus hispidus* Bull ex Fr

(Hymenochaetaceae-Basidiomycetes)

Generally it causes spongy white rot of living hard woods. In West Pakistan it is commonly found on *Juglans regia* in Swat. In the incipient stage of attack wood becomes slightly colourless. In severe attack wood is reduced to a soft, spongy, yellowish to whitish mass. Fungus enters the host through wounds caused by frost cracks and lopping.

Sporophore is large 8-25cm. wide. It is rigid and becomes hard on drying. Upper surface of the sporophore is dark-brown to rusty red or almost black with densely hirsute top. Lower surface is golden brown. With age it becomes dark brown. Pores are minute and thin walled. Spores are smooth, ellipsoidal to broadly ovate 7-9.5  $\times$  6-8  $\mu$ .

## 3. White Mottled Rot

Causal organism:—

*Polyporus squamosus* Huds. Fr.

(Polyporaceae-Basidiomycetes)

It causes rot of the heartwood. Sap wood is also attacked, once the decay is established in heartwood.

Fungus enters through wounds and decay is usually restricted to the vicinity of wounds. The attacked wood becomes soft, spongy and mottled.

Sporophore is short, thick, excentric or laterally stalked. It is fleshy and tough but becomes rigid when it is dry. It is 6 to 30 cm. wide and is subcircular to reniform. Pore surface is white or yellowish. Pores are minute and thin walled. Spores are ellipsoidal  $9-10 \times 5-6 \mu$ .

#### 4. White Stringy Rot

Causal Organism:—

*Stereum hirsutum* Willd. ex. Fr.

(*Stereaceae-Basidiomycetes*).

It is a wound parasite and is found on dead wood. It causes white stringy rot of heart wood and also attacks sap wood causing uniform white sap rot.

Sporophore is coriaceous, semicircular, effused, reflexed or resupinate. Upper surface is whitish, cream-buff or brown to gray in colour. It is also hirsute and sonate. Lower surface is yellowish buff and brown to smoke gray in colour. Pores are small. Spores are hyaline, cylindric and  $5-8 \times 2-3.5 \mu$ .

#### 5. White Rot

Causal Organism:—

*Pleurotus ostreatus* (Fr.) Quel

(*Agaricaceae-Basidiomycetes*).

It is a common mush-room which is usually a saprophyte but may rarely become wound parasite causing white rot of sapwood as well as heartwood.

In incipient decay narrow brown zones are formed on the wood which in advance stage become light in colour.

Sporophores are fleshy, annual, sessile or slightly stalked. Upper surface is smooth, white or grayish. The gills on the lower surface extend up to the stalk.

#### 6. Walnut Dieback

Causal Organism:—

*Melanconium juglandinum* KZe.

(*Melanconiaceae-Melanconiales*).

It is a weak parasite and is generally found on branches. It forms small black pustule like structures. Conidial acervuli break through the epidermis of dead bark.



The progress of disease is slow. In severe conditions the trees become markedly stag-headed. The fungus may also reach the main stem and may cause death of trees ultimately.

7. Powdery Leaf Spot

Causal Organism:—

*Microstroma juglandis* Bereng.

(*Melanconiaceae-Melanconiales*).

It forms white powdery pustules on lower surface of the leaves and rarely on the stem.

8. Leaf Spot

Causal Organism:—

*Gnomonia-leptostyla* (Ces. and de Not) Kleb.

(*Gnomoniaceae-Diaporthales*).

It forms globular perithecia on the host which are generally immersed in the substratum. The spots formed on the lower surface of the leaves and rarely on fruits are small. They are white to grayish-yellow in colour with brown edges and are irregular in outline. The attacked leaves and fruits fall pre-maturely. The repeated attacks of the disease weaken the tree causing ultimate death.

In addition to the above fungi the following fungi were also recorded on the host which do not cause serious damage.

1. *Exosporium tiliae* Link ex Schlecht.  
(*Dematiaceae-Moniliales*).

2. *Gloniopsis curvata* (Fr.) Sacc.  
(*Hysterizcea-Dothiorales*).

3. *Hypoxylon multiforme* Fr.  
(*Xylariaceae-Plectascales*).

4. *Phoma Junglandina* (Fuck.) Sacc.  
(*Sphaeropsidaceae-Sphaeropsidales*).

5. *Rhabdospora juglandis* (Schw.) Sacc.  
(*Sphaeropsidaceae-Sphaeropsidales*).

6. *Volutella fructi* Steven and Hall  
(*Tuberculariaceae-Moniliales*).

Control:—

1. Wound parasites are found to be more destructive. It is therefore, suggested

that care should be taken not to inflict injuries to the trees. This can be done by stopping illicit lopping for grazing and fuel purposes. Under unavoidable circumstances antiseptic material may be applied on the wound. (3).

2. The perennial fruit bodies which continue to produce spores in successive years detrimental to the adjoining trees should be removed and destroyed.

3. Diseased trees should be removed during intermediate and final cuttings; otherwise they may spread the disease to other trees. In case disease is restricted to the branches they should be pruned off well below to apparent infected portion of the wood. The wound thus created may be sealed of with some suitable antiseptic material.

4. *Juglans regia* may be grown mixed. The chances of infection are thus reduced to a considerable extent.

#### ACKNOWLEDGEMENT

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#### EXPLANATION OF PLATES.

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|---------------|---|
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| Plate No. II  | .. (a) Upper surface of <i>Inonotus hispidus</i> .<br>(b) Lower surface of <i>Inonotus hispidus</i> . |
| Plate No. III | .. Sporophore of <i>Stereum hirsutum</i> .  |
| Plate No. IV  | .. Sporophore of <i>Pleurotus ostreatus</i> .   |
| Plate No. V   | .. Fruits of <i>Juglans regia</i> attacked by <i>Gnomonia leptostyla</i> .                            |



# PLATE I

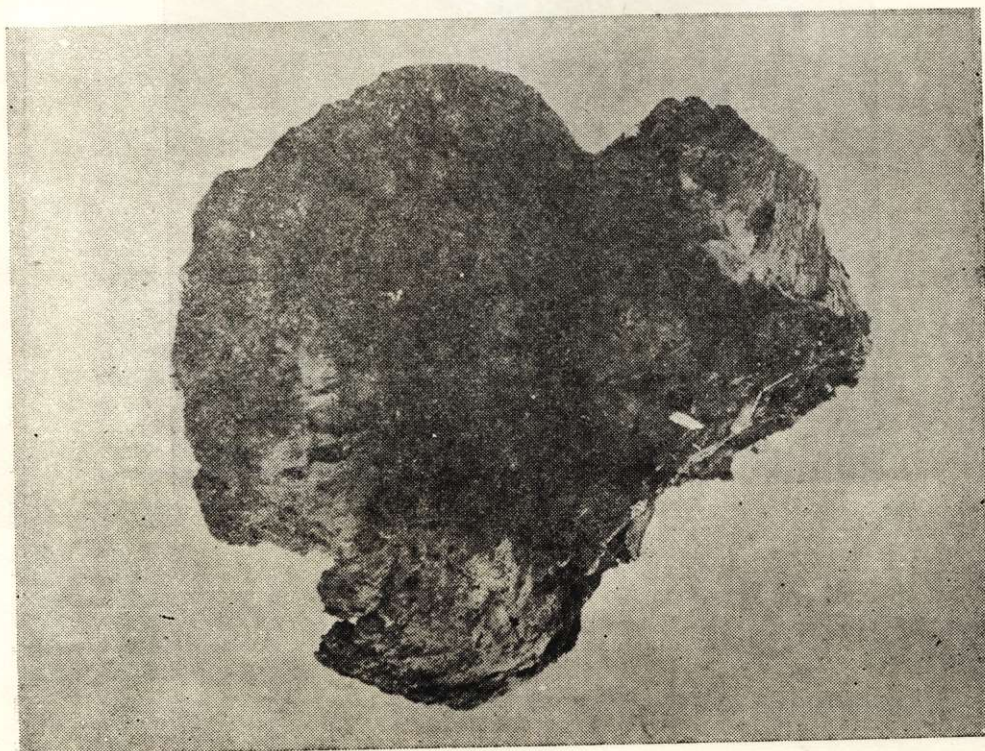




PLATE II



(b)



(a)



PLATE III

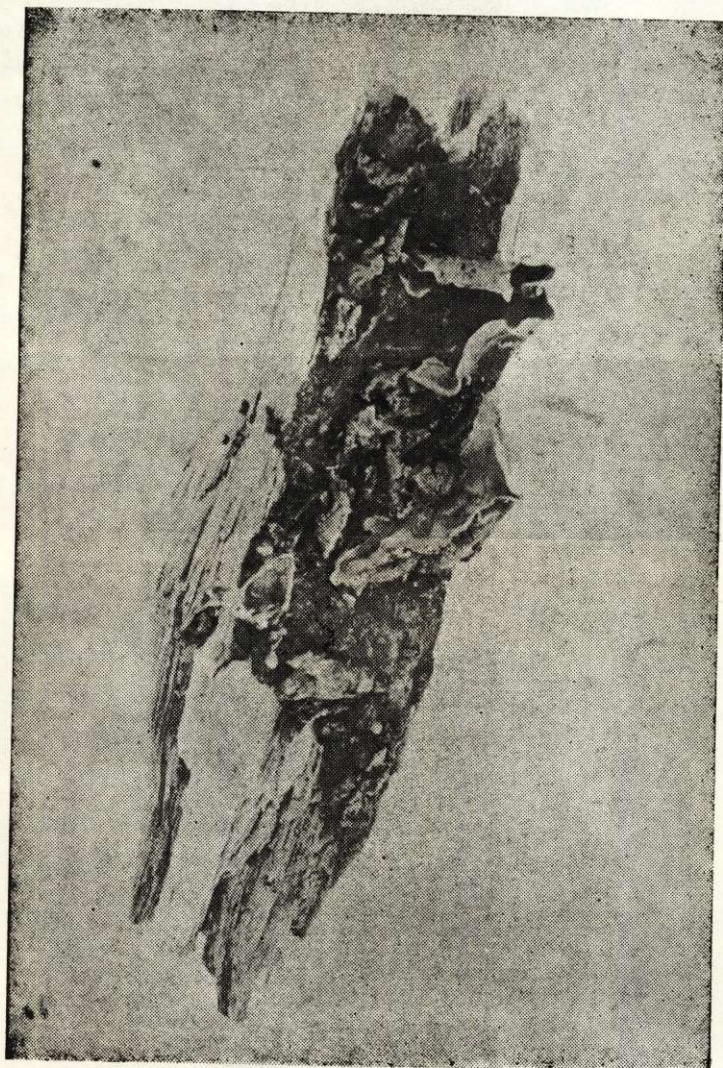




PLATE IV





PLATE V

