Bull. Iraq nat. Hist. Mus.
(2003) 10 (1): 7-11

DIAGNOSIS OF SOME PATHOGENIC FUNGI ON SELECTED LOCAL WOODS

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ABSTRACT

To explore the durability of some local species of wood to fungal deterioration among the storage period, this research has conducted on three species *Eufcalyptus cammaldulensis, Juglans regia*, presence of some genus of fungi; *Aspergillus, Penicillium,Botryoderma, Chaetomium, Phoma, Cladosporium* and *Pacilomyces* in different intensities.

The two fungi *Aspergillus* and *Penicillium* appeared more dominants than others, therefore they were chosen for the pathogenicity test. The results showed that the two species of fungi preferred *Juglans* wood firstly were the size of infection was more than 10 times of any of the other two woods. *Eucalyptus* showed similar response to that of *Morus*, but with *Aspergillus* it was few better.

INTRODUCTION

Wood is an important raw material, which considers as a primary source of different products for multiple purposes and uses. It normally exposes to many factors that cause its deterioration. Biological degradation is one of the most important factors that reveal to decrease the using age of wood. Different types of organisms attack the wood inside buildings as well as at exterior places. It's well known that wood under direct climatic condition changes should have more severe affects than that under covered areas. Physical factors; temperature, humidity, direct sun light, winds…etc. act side by side with biological factors to accelerate aging of wood outside doors, especially when it has not been treated against these factors (Kollmann and Cote, 1968, Abd Ali *et al*., 1993).

Green wood should be seasoned either by air seasoning or by kilns before being manufactured or used. During air seasoning or among the storage period, while the ambient conditions are favorable, wood could be attacked by many species of fungi (F. P. L., 1974), that depends on to what extent the conditions are suitable and on the species of wood.

In Iraq, however, where no kilns drying being used, air seasoning is the dominant. Therefore, wood in the Seasoning areas and during the storage period should be attacked by these organisms (Jagjit Singh, 2001). Hence, three species of local woods were chosen to check out (1): the species of fungi by which wood been infected, and (2): the resistance of these woods to the different species of fungi.

MATERIALS AND METHODS

Specimens collection: Small bolts of three wood species; *Eucaluptus camaldulensis, Juglans regia*, and *Morus alba* were selected from wood stores in Mosul. The speciemens had passed a period of 12 to 18 months in the storage areas, i.e. they were being in the store during the four-year seasons. The symptoms were observed on the infected samples such as stain, rot and mold. Also, the natural color showed different degrees of deviation from their normal colors. Heart wood and sap wood zones could be recognized that age of the samples

was not less than 20 years, as the annual ring referred. Some of them showed marks or tunnels as evidence to prior borer insect attack especially at the heartwood region, at the time of studying they were free from insects.

Isolation: Diagnosis has done by checking the hypha, mycelium and spores and fructification bodies in depending on the taxonomial keys.

Pathogenicity: Three equal pieces were cut from each wood species to test the pathogenicity. The inoculation has prepared from the pure fungal culture of *Aspergillus* and *Penicillium* at a range of one petri dish for each wood piece, though three replications for each species were applied. Then inoculated and kept in a deep vessels and covered with polyethlene sacs and irrigated every day with 10-15cm^{3}of water per each vessel to keep the humidity in a proper levels. Samples were left under the laboratory temperature (30-35) C° until getting results after 50-60 days. Results resembled by the following symbols according to the degree of infection, (Al-Ma'arof, 1984):

0-No infection.
1- Infection 25% from the size of piece.
2- Infection 50% from the size of piece.
3- Infection 75% from the size of piece.
4- Infection 100% from the size of piece.

The disease index (DI) was calculated by the equation stated by (Mickinney, 1923, Komm and Stevenson, 1978 and Diwan, 1977 Al-Ma'arof, 1984):

DI = no. pieces in degree 0x0 + no. pieces in degree 1x1 + …no. pieces in degree 4x4 / no. all pieces of all degrees.

RESULTS AND DISCUSSION

The isolation and diagnosis according to (Barnett and Barry, 1972) showed that both of variables affected the frequency of fungus presence in the wood (table 1). Although the wood samples were being under the same storage conditions, quite a lot of difference could be observed between them. While *Penicillium* was the dominant fungus on *Morus*, it could not be isolated from *Eucalyptus* wood.

Other isolations of fungi (except *Aspergillus* on *Juglans*) showed either no infection or 16.6 percent depending on the species of the two variables.

Table 1: The percentage of fungus infection on three wood species.

Wood species	Genus of fungi						
	Asper-gillus	*Penic-illium*	*Botryo-derma*	*Phoma*	*Chaet-omium*	*Clados-porium*	*Pacidilo-myces*
Juglans	66.6	16.6	-	-	-	-	16.6
Eucalyp-tus	-	-	16.6	16.6	16.6	16.6	-
Morus	16.6	83.3	-	-	-	16.6	-

The analysis of variance of diseases indexes in pathogenicity test (table 2) approved that fungus species as well as the species of wood were highly significant, so was the interaction between these two factors.

Table 2: The effect of fungus and wood species on disease index

Source	Df	Mean square	F cal
A (fungus sp.)	2	6.565	39.369**
B (wood sp.)	2	8.620	51.722**
A*B	4	3.037	18.222**
Error	18	0.167	
Total	26		

**: Significant at 0.01 leve

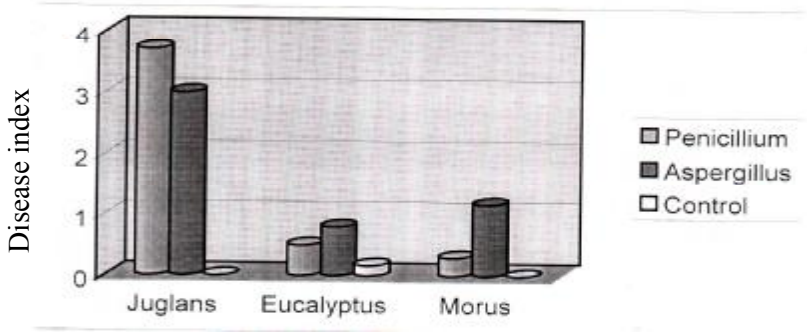
It is shown in table (3) that maximum disease index was obtained on *Juglans* wood by *Penicillium*. The same fungus had less than one-tenth this value on *Morus* (0.30), few more had *Eucalyptus* wood (Fig. 1). With *Aspergillus* the disease index followed the same different response, were *Eucalyptus* had the best results. That means *Juglans* is less durable within the three species followed by *Morus* and then *Eucalyptus* wood. This difference might be as a result to the differences in the structure of the wood such as size and number of vessels and pits, and to the percentage and type of wood extractives.

Table 3: The disease index in the pathogenicity test.

Rep.	Woods								
	Juglans			*Eucalyptus*			*Morus*		
	P	*A*	*C*	*P*	*A*	*C*	*P*	*A*	*C*
R1	4.00	3.50	0.00	0.50	1.00	0.50	0.00	1.50	0.00
R2	4.00	2.50	0.00	1.00	1.00	0.00	0.50	1.50	0.00
R3	3.00	3.00	0.00	0.00	0.50	0.00	0.50	0.50	0.00
Total	11.00	9.00	0.00	1.50	2.50	0.50	1.00	3.50	0.00
mean	3.70	3.00	0.00	0.50	0.80	0.17	0.30	1.17	0.00

P = *Penicillium* A = *Aspergillus* C = Control

Fig. (1): Mean of disease index on the three wood species



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ص ل ا خ ل ا

ـدف معرفة أنواع الفطريات التي تصيب الأخشاب في المخازن، أجريت الدارسة على ثلاث أنواع من الأخشاب المحلية هي :

Eucalyptus cammaldulensis , *Juglans regia* , *Morus alba*

وتم عزل أجناس الفطريات التالية :

Aspergillus, Penicillium, Botryoderma, Chaetomium, Phoma, Pacidiomycetes, Caladosprium.

وقد ظهر إن الفطرين *Aspergillus* و *Penicillium* هما اكثر الانواع تكراراً لذلك تم اختيارهما لإجراء اختبار القابلية الامراضية . أظهرت النتائج إن القدرة الامراضية للفطرين المذكورين على خشب الجوز كانت أكثر من عشرة أضعاف ما حصل لكل من خشب اليوكالبتوس أو التوت . و ظهر إن خشب اليوكالبتوس يبدي استجابة مقاربة لتلك التي يبديها خشب التوت إلا انه مع الفطر *Aspergillus* كان أفضل بقليل .