

**PRELIMINARY OBSERVATIONS ON THE PEAR ROOT
BEETLE, *XYLEBORINUS SAXESENII* RATZ.
(COLEOPTERA: SCOLYTIDAE)**

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Abstract

Xyleborinus saxeseni Ratz. beetle infests the trunk and branches of apple, apricot, pecan, plum, casuarina, oak, poplar, walnut and willow trees. The present study detected that this beetle also infests pear tree roots in several orchards in different governorates.

The relative preference of *X.saxeseni* to different hosts differed according to the host type, highest percentage of entrance holes recorded on plum and pear (26% and 25%, respectively), the lowest percentage was on peach (1%), while citrus was entirely free of infestation.

The ability of PRB to penetrate through the soil to infests the pear roots decrease with increase the soil thickness.

Seasonal abundance revealed that the beetle was abundant during the whole year round, five peaks were observed at the 1st half of May, 2nd half of June, 1st half of August, 2nd half of september and 2nd half of November.

INTRODUCTION

Complaints from pear growers referring to the withering then full death of the trees have recently increased. Initial observations revealed the occurrence of a scolytid root borer, *Xyleborinus saxeseni* Ratz., that seems to be responsible for such damage. This borer was reported earlier from Germany on *Populus tremula* (Karpinski, 1925), USA on pecan and peach (Leiby, 1952 and Kavoch & Gorsuch, 1985), England on apple (Light, 1926), France on apricot and plum (Paillot, 1926), Poland on felled oak and alder timber (Karpinski, 1933), Russia on walnut (Gusev, 1940), Austria on plum and apple (Egger, 1973) and Egypt on apple, apricot, plum, walnut and lantana (Girgis, 1987).

The pest is known in Egypt as the pear root beetle (PRB). Due to the scarcity of knowledge on *X.saxeseni* in Egypt, the present preliminary observations on its host range, distribution, damage, symptoms of infestation and seasonal abundance were aimed with the hope of developing recommendations that may help avoiding or, at least, minimizing its threat.

MATERIALS AND METHODS

Host range and symptoms of infestation Several visits to numerous fruit orchards as well as wooden trees scattered all over the country were made throughout the period of about two years extending from June 1996 to June 1998, the attacked host was recorded wherever infestation. In pear orchards, in particular, the percentage of trees infested with PRB was estimated and symptoms of infestation described.

Host preference: The host preference of PRB was studied in the laboratory by exposing cutting of certain fruit and wood trees (Apple, apricot, citrus, peach, pear, pecan, plum, walnut, casuarina and willow) to pear roots infested with PRB for 3 days. Cuttings were 20 cm long and 3 cm in diameter of the hosts, each contains one cutting of each host and 5 cuttings of every tested host were placed together with infested pear roots in plastic containers. On the 4th day after exposure, the number of beetle holes on the cuttings was counted and used as a parameter to assess host preference.

Penetration through the soil: To determine the ability of PRB to attack roots, 18 fresh pear cuttings (each 15 cm long X 3 cm diameter) were covered with mud coats taken from the soil of the same infested orchards. Mud coats were 1, 2, 4, 6, 8 and 10 cm in thickness. Every coated cutting was introduced into a plastic box supplied with 10 beetles. Cuttings were examined three days later and the number of beetle holes on them counted.

Seasonal abundance: For monitoring PRB population, the root system of one infested pear tree was monthly examined. A badly infested pear orchard at meet-badr halawa (Gharbia governorate) was selected for that purpose and transferred to the laboratory, where it was covered with muslin and frequently sprayed with water to maintain high moisture around the roots. Four fresh pear cuttings (each 40 cm long by 5 cm diameter) were inserted into the soil around the root system. The number of beetle holes on the cuttings was counted twice a month from March 1997 to February 1998.

RESULTS AND DISCUSSION

Hosts and distribution: Girgis (1987) reported that in Egypt *X.saxeseni* infests apple, apricot, plum and walnut trees as well as lantana shrubs. The present survey added pear roots, casuarina, poplar, pecan and willow trees as possible hosts.

PRB seems to be widely distributed in several pear orchards in the different governorates including Beheira, Gharbia, Menofiya, Giza, Ismailyia and Fayoum. The highest infestation occurred in Gharbia (39%) and Beheira (28%) while less infestations were

recorded in Giza (12%), Menofiya (10%), Ismailiya (8%) and Fayoum (3%).

Damage and symptoms of infestation: *X.saxeseni* causes severe damage to pear tree root system. Subsequently, attacked trees become weak and ultimately die. At the early stage of infestation, no definite symptoms appear above ground level. As infestation proceeds, the trees weaken gradually with a sickly appearance and the leaves render pale yellow then they become extremely weak and deep cracks develop on the bark which splits up at crown region. At this stage, fine pale brown dust may be seen on the bark at the trunk base and/or above soil surface. If bark is removed, small circular holes leading to black short tunnels are easily seen in the wood. Root damage may result in the dryness and death of tree branches also.

When the soil around the infested roots is removed, small holes in the hypodermis appear leading to tunnels that run directly through the bark into the wood. These tunnels lead to another short sets of galleries. The latter are of a uniform diameter with black-stained walls. Such black colour results from the growth of ambrosia fungi which planted by the beetles into the tunnels for feeding. The infested root dries gradually from outside to inside.

Hosts preference: The relative preference of *X.saxeseni* to different hosts measured by percentage of entrance holes of beetles on branch cuttings. Tested hosts were descendingly arranged according to their relative preference of *X.saxeseni* as follows: plum (26%) followed by pear (25%) then mango (11%), apricot (8%), apple (7%), pecan (7%), walnut (6%), casuarina (5%), willow (4%) and peach (1%), while citrus was entirely free of infestation.

PRB showed a marked preference for the pear roots than stems as 94.7% (80-100%) and 5.3% (0-20%).

Penetration of *X.saxeseni* through soil: Data on the ability of *X.saxeseni* beetle to penetrate through the soil is shown in Table 1. This table refers that 83.3% (80-92.5%) of the beetles penetrated in cuttings coated with 1 cm thickness mud. Increase of thickness of mud coating decreased the penetration ability of the beetles into cuttings which reached to 8.3% (0-15%) at 8 cm thickness and zero % at 10 cm soil thickness.

Seasonal abundance: Fig 1 shows the half monthly numbers of *X.saxeseni* beetle emerging from infested roots of pear trees through a year extending from March 1997 to February 1998. Beetles occurred all the year round with five distinct

peaks as follows: 1st half of May (72 beetles), 2nd half of June (25 beetles), 1st half of August (68 beetles), 2nd half of September (124 beetles) and 2nd half of November (36 beetles).

Wahl (1914) in Germany, reported that the time of flight of *Xyleborus saxeseni* is from about the end of May till the middle of June and if conditions are favourable, a second generation may appear in August, while Roling and Kearby (1975) in Missouri, using sticky traps placed on attractive host material in same location, observed that *Xyleborus saxeseni* exhibited a distinct flight period at the latter part of June and into the first 3 weeks of July where the number of beetles decreased. In Egypt, Girgis 1987 using sticky traps, baited with 50% ethanol, mentioned that *X.saxeseni* beetle had three distinct activity periods a year. Initial occurrence took place by the end of February and beetles disappeared from May until the 3rd week of September then resumed occurrence by the 2nd week of December.

Table 1. Penetration percentage of *X.saxeseni* beetle through the soil at different thickness.

| Coat thickness (cm) | Penetration% | |
|---------------------|--------------|---------|
| | average | range |
| 1 | 83.3 | 80-92.5 |
| 2 | 66.7 | 75.85 |
| 4 | 41.7 | 20-60 |
| 6 | 21.7 | 15-30 |
| 8 | 8.3 | 0.15 |
| 10 | - | - |

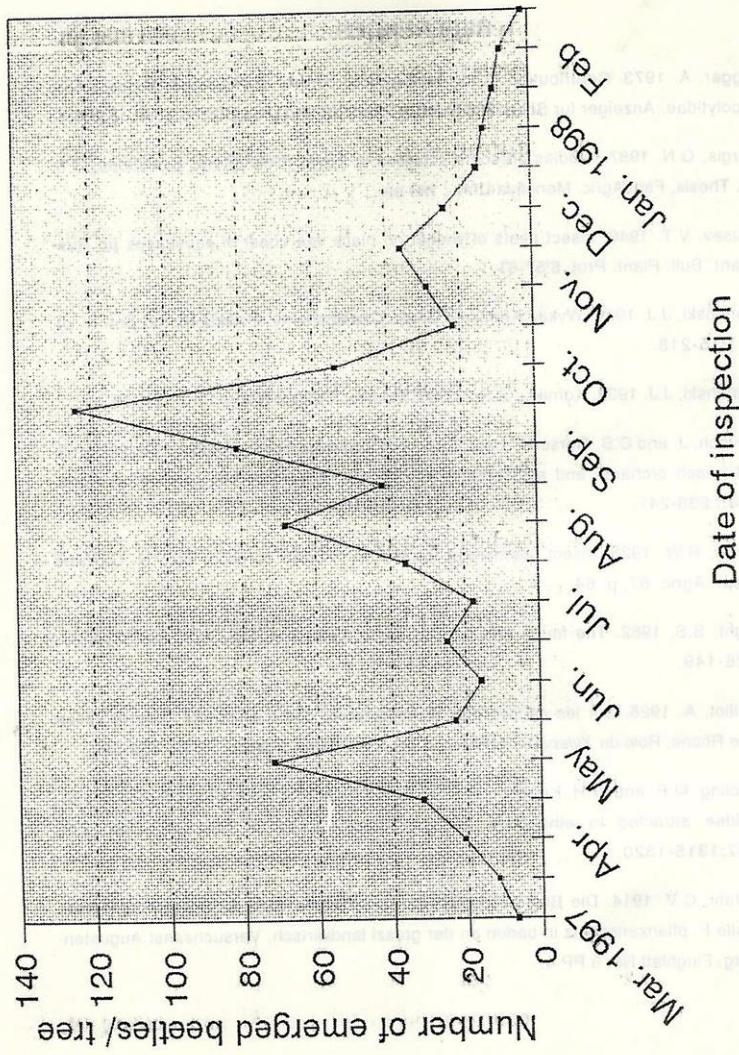


Fig. 1. Half monthly population of emerged PRB, X.saxoseni beetle, from pear trees during period from Mar. 1997 until Feb. 1998.

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ملاحظات أولية عن خنفساء جذور أشجار الكمثري
Xyleborinus saxeseni Ratz.

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معهد بحوث وقاية النباتات - مركز البحوث الزراعية - الدقي - الجيزة.

تصيب خنفساء جذور أشجار الكمثري *X.saxeseni* جذوع وأفرع عوائل نباتية متعددة أهمها التفاح، المشمش، البيكان، الحور، الجازورينا، البلوط، الجوز، الصفصاف، البرقوق كما تهاجم أيضا في مصر جذور اشجار الكمثري، حيث تسبب ضعف وجفاف وموت الاشجار التي تصيبها وبالتالي نقص المساحة المنزرعه وقلة الانتاج. وقد تعرض هذا البحث لتوضيح أهم عوائل خنفساء جذور الكمثري في بعض محافظات مصر، كذلك وصف مظاهر الاصابة في اشجار الكمثري والضرر الذي تسببه هذه الحشرة وقد وجد أن:

- تختلف عوائل هذه الخنفساء في درجه قابليتها للاصابة، وكان اكثرها قابلية للاصابة هو البرقوق والكمثري، في حين كان أقلها قابلية للاصابة هو الخوخ ولم تصاب الموالح بهذه الخنفساء.

- لهذه الخنفساء القدره علي اصابه الجذور من اسفل سطح التربه والانتقال خلالها، وتختلف قدره الاختراق تبعا لسلك التربه حول المجموع الجذري.

- عند تتبع الوفرة الموسمي لهذه الحشرة أظهرت الدراسة ان هذه الخنفساء تكون متوفره داخل جذور اشجار الكمثري المصابة طوال العام، ويشير تعداد الخنافس الخارجه الي وجود خمسه قمم لنشاط هذه الحشرة سجلت خلال النصف الاول من مايو، النصف الثاني من يونيو، النصف الاول من اغسطس، النصف الثاني من سبتمبر، النصف الثاني من نوفمبر.