



GRANULATE AMBROSIA BEETLE *XYLOSANDRUS CRASSIUSCULUS* (MOTSCHULSKY) (COLEOPTERA: CURCULIONIDAE: SCOLYTINAE: XYLEBORINI) BORES INTO THE FUEL PIPE OF PETROL VEHICLES

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ABSTRACT

The granulate ambrosia beetle *Xylosandrus crassiusculus* (Motschulsky) has been reported to bore into the fuel pipe of petrol vehicles, leading to petrol leakage and fire accidents. Blending of ethanol in petrol due to the National Policy on Biofuels is implicated in *X. crassiusculus* getting attracted to the fuel pipe of petrol vehicles leading to burning of vehicles and loss of life.

Key words: *Xylosandrus crassiusculus*, Ambrosia beetle, petrol vehicles, fuel pipe, reinforced rubber, National Policy on Biofuels, methanol, fire accidents, Kerala, India

Since 2022, in northern and central Kerala, several instances of petrol leakage and subsequent fire accidents involving motor cars and two wheelers were reported. In a few bizarre cases, moving cars caught fire and the travelers were trapped inside and charred to death. Motor mechanics observed petrol leakage through tiny holes on the fuel pipes, which may catch fire due to short circuit and ultimately lead to the entire vehicle bursting into flames. Observation of the fuel pipes revealed that the small boreholes are produced by the granulate or Asian ambrosia beetle *Xylosandrus crassiusculus* (Motschulsky) (Coleoptera, Curculionidae, Scolytinae, Xyleborini), which is a noxious invasive pest distributed throughout the world and has a very wide host range (Dole and Cognato, 2010). Prathapan and Hiremath (2018) reported its massive infestation on nutmeg and clove in northern Kerala.

MATERIALS AND METHODS

Damaged fuel pipes from Idukki, Kannur and Kasaragod districts in Kerala were examined. Workshops in Kannur district were visited and six fuel pipes having bore holes as well as beetles inside the bore holes, were collected. Dimensions, number of bore holes (both completed and incomplete) and the diameter of completed boreholes were measured and photographed using Leica MC 170 HD camera mounted on Leica M 80 stereo zoom microscope. The Media Cell of the Motor Vehicles Department, Government of Kerala was contacted for information. A voucher

specimen of *X. crassiusculus* (accession number NIM/NBAIR/COL/CUR-1/092023) was deposited in the ICAR-National Bureau of Agricultural Insect Resources (ICAR-NBAIR), Bengaluru.

RESULTS AND DISCUSSION

All the damaged vehicles were using petrol as fuel. Diesel or Compressed Natural Gas vehicles were not affected. Observations of fuel pipe damage are presented in Table 1 (Figs. 1 a-h). All the fuel pipes examined were made out of reinforced rubber and the diameter varied from 10-40 mm. The number of completed (Fig. 1c) and incomplete (Fig. 1d) boreholes near a clip (Fig. 1a) used for fastening the fuel pipe, varied from 0-7 and 0-10, respectively. Boreholes away from clips (Fig. 1b) varied from 0-8 and 0-5 in the case of completed and incomplete ones, respectively. Total of 22 completed (Fig. 1c) and 19 incomplete (Fig. 1d) boreholes were observed. The mean number of completed boreholes per 10 cm pipe length varied from 0.5-3.6 (mean 1.32 mm, n = 6) having a diameter of 1.21-1.34 mm (mean 1.27 mm). Higher incidence near clips used for fastening the fuel pipe, indicates non-preference of the beetle for clean, open areas, as the clips provide cover and better grip for the insect to bore into the pipe.

An unpublished report on fire accidents and fuel leakage, prepared by the Motor Vehicles Department, Government of Kerala, in 2023, has mentioned 133

Table 1. Extent of damage in six fuel pipes examined

No	Pipe code	Pipe dimensions (mm)		Number of bore holes						Mean no. of completed holes per 10 cm pipe length	Mean dia of completed holes (n=3)
		Diameter	Thickness	Length	Near clip		Away from clip		Total		
					Completed	Incomplete	Completed	Incomplete			
1	P1	35	4.4	220	0	2	8	5	7	3.6	1.21 mm
2	P2	10	3.6	340	0	0	2	0	0	0.5	1.27 mm
3	P3	16	3.05	430	1	1	2	3	4	0.46	1.34 mm
4	P4	40	5.46	260	2	1	6	1	2	2.3	1.33 mm
5	P5	35	3.86	270	1	3	1	0	3	0.37	1.21 mm
6	P6	10	3.6	420	3	3	3	0	3	0.71	1.26 mm
				Total	7	10	22	9	19	1.32 (n=6)	1.27 mm (n=6)

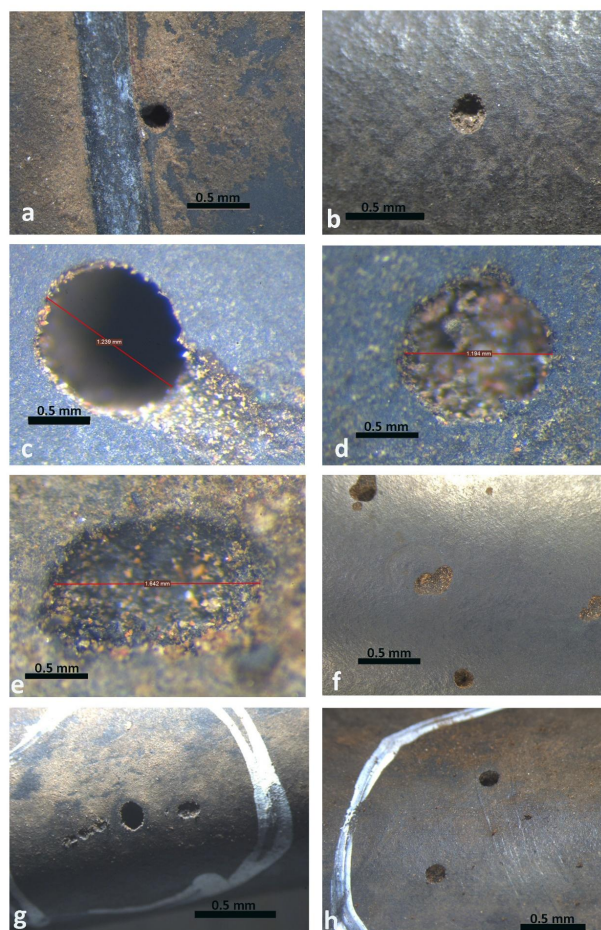


Fig. 1. Figs a-h. Boreholes of Asian ambrosia beetle *Xylosandrus crassiusculus* (Motschulsky) on fuel pipes of motor cars. a. bore hole near a clip of pipe, b. bore hole away from the clip of pipe; c. completed circular bore hole; d. incomplete circular bore hole; e. incomplete elliptical bore hole; f. irregular bore holes; g, h. cluster of boreholes

cases of fuel leakage, of which 102 were due to beetle infestation in petrol vehicles, and 11 of them met with fire accidents. Majority of the cases were from rural areas (105 no), while only 18 were from urban areas. Only 10 cases of fuel leakage were reported from the high ranges. Higher incidence in vehicles from rural areas clearly indicates involvement of ambrosia beetles which are common in agricultural areas where plant diversity is higher than in urban areas. The National Policy on Biofuels (2018) achieved a blending rate of 10% ethanol in petrol in June 2022, which is targeted to reach 20% by 2030 (Ministry of Petroleum and Natural Gas 2023). However, ethanol serves as an attractant for *X. crassiusculus* and other ambrosia beetles, hence it is used in baits and traps for detecting and monitoring (Gorzlancyk et al., 2014). Considering the seriousness of the issue, immediate measures, including substitution of reinforced rubber with safer material for manufacture

of fuel pipes of petrol vehicles, should be initiated to save life and property.

To the best of our knowledge, this is the first report of an ambrosia beetle damaging the fuel pipe of motor vehicles.

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AUTHOR CONTRIBUTION STATEMENT

SKM collected fuel pipes, recorded data, and revised the manuscript. KDP identified *X. crassiusculus*, examined damaged fuel pipes and prepared the first

draft of the paper. SSA examined fuel pipes, recorded data and prepared the plate. All authors read and approved the manuscript for submission.

CONFLICT OF INTEREST

No conflict of interest.

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