have been reported[1]. Alluvial deposits of semi-arid region of eastern most part of western upland of Maharashtra have not been dated so far due to non-availability of datable material. Hence a discovery of fossil wood from alluvial deposits of Sina river, a tributary of Bhima river, seems to be of geomorphic importance.

Figure 1 shows the geological section across the Sina river near village Pakani (N 17°51′–75°10′) in the Solapur district of Maharashtra. Flows of Deccan Trap Basalt of Cretaceous-Eocene age are exposed on left bank while they are covered with thick alluvial deposits on the right bank of the Sina river. Carbonised fossil wood has been encountered 9 m below the present river bed during excavation of the foundation of K.T.Weir. The fossil wood was sent to the Birbal Sahni Institute for carbon-14 dating. The Institute furnished the age of fossil wood as 4260 ± 110 years B.P. (BS-458) which indicates that the semiconsolidated conglomeratic bed occurring in the vicinity is of nearly the same age. This date confirms the general observations that most of the rivers in Western Maharashtra flow below the present river bed during Early and Mid Holocene times. Geological setting and depth at which the fossil wood was discovered indicate that the local depression or fall might have formed due to the erodeble characteristic of rock occurring in the vicinity.

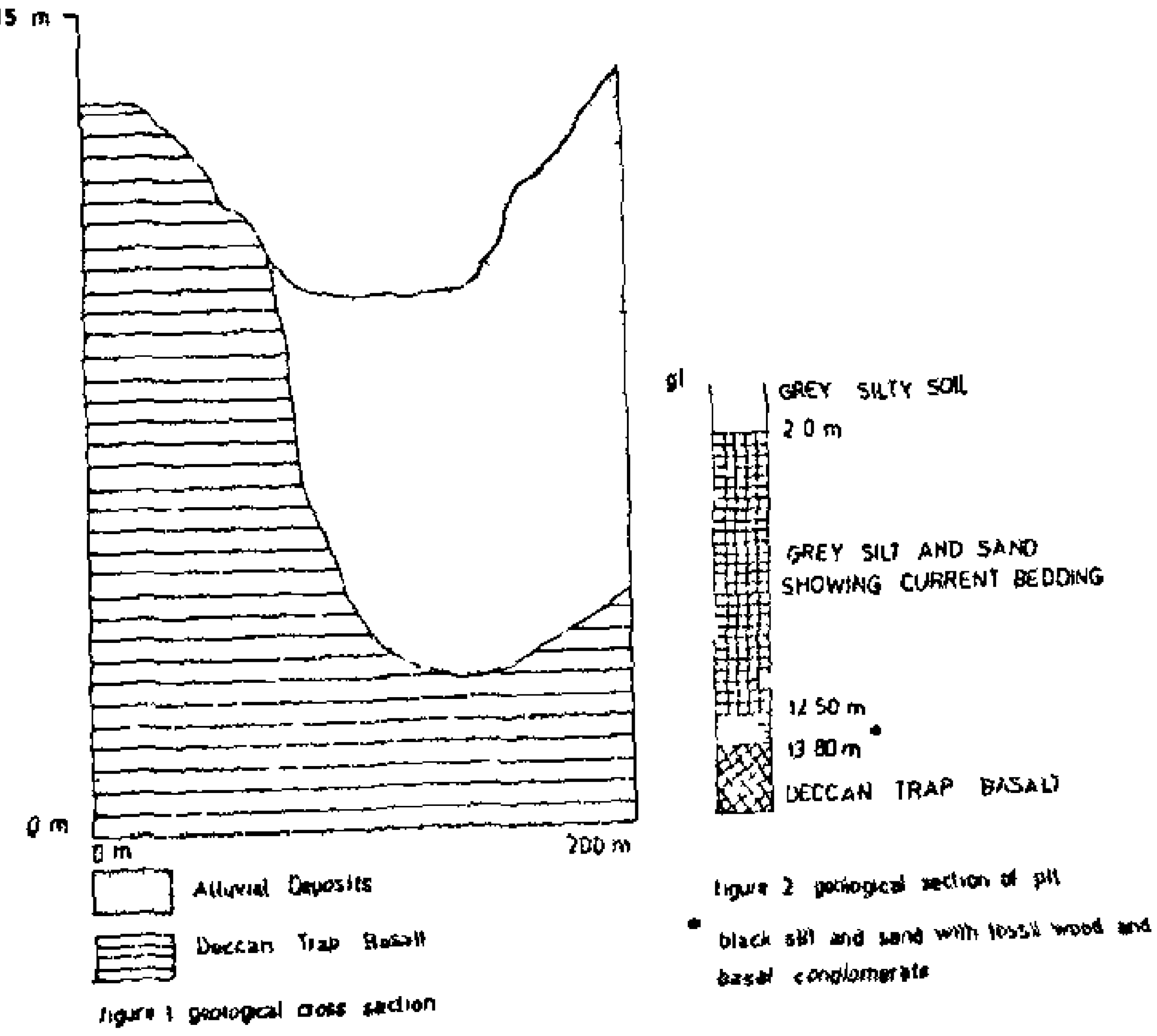

Figure 1. Geological cross section and geological section of pit.

10 June 1985; Revised 5 September 1985

1. Rajguru, S. N. and Kale, V. S., G S I Bangalore, 1983, 26, No. 1.

DOES EYESTALK ABLATION INDUCE HYPERPHAGIA?

T. J. PANDIAN and S. SINDHU KUMARI
School of Biological Sciences, Madurai Kamaraj University, Madurai 625 021, India.

NON-AVAILABILITY of adequate number of spawners of penaeid prawns triggered most of the researchers to concentrate their work on the reproduction of these prawns in captivity[1]. Efforts have been made during the past 10 years to induce prawns, which normally mature and spawn only in the sea, to attain maturity under captive conditions[2]. Carideans differ from penaeids by the ease with which they mature, mate, spawn and incubate their eggs in captivity. Eyestalk ablation confines these events within a shorter inter-molt period. Though the molt and growth-enhancing effects of eyestalk ablation have been studied by many authors[3–5] in various decapod crustaceans, studies on the effects of food consumption by natantians are lacking. In diecdysic prawns molting and reproduction are synchronizing events and hence they have to apportion the available energy simultaneously for reproduction and molting[6]. This is true of adult *Macrobrachium nobilii*. Juveniles of *M. nobilii*, on the other hand, spare no energy on reproduction. Therefore it was decided to perform eyestalk ablation on juveniles so that its effect on somatic growth could be traced out.

Juveniles of *M. nobilii* (0.25 ± 0.05 g; 28 ± 2 mm length) collected from the Cauvery waters, Tiruchirapalli were acclimated to laboratory conditions. A control (non-ablated) and an unilateral eyestalk (left) ablated groups were studied for four successive months. Food consumption, growth (joule/g animal) and growth efficiency (%) were quantified and the data were statistically analysed.

Table 1 reveals that ablated *M. nobilii* significantly ($t = 5.65$; $P < 0.0005$) consumed more food (1.1 times) than that of the control. Growth was also increased by 1.6 times and the growth efficiency 1.5 times in the destalked group. All these increases were statistically significant (student's t test—growth, $t = 13.0$, growth efficiency $t = 10.6$; $P < 0.0005$).

Table 1 *Consumption (C), Growth (P) (J/g prawn) and growth efficiency (K_1; %) of control and eyestalk ablated (unilateral) prawn Macrobrachium nobilii, for four successive months.*

	C	P	K_1
Control	28140 ± 1020	3000 ± 205	10.5 ± 1
Eyestalk-ablated	31620 ± 1540*	4830 ± 364*	15.5 ± 1*

Each value represents the average (± S.D.) performance of about 10 animals
* $P < 0.0005$ statistically significant

M. lanchesteri[8], which underwent uni- or bilateral eyestalk ablation, showed no marked variation in the food consumption, while *Palinurus homarus*[9] (marine form), after bilateral eyestalk ablation, increased the food intake (50 to 97 % more than the control). In the unilaterally destalked *M. nobilii*, growth efficiency showed an increase of 32 % over the control, which in *M. lanchesteri*[8] was only 17 %.

Our studies on *M. nobilii* bring to light the fact that eyestalk ablated prawn consumes more food than their non-ablated counterparts. This is the first communication, which attributes the faster growth of eyestalk ablated prawns to increased food consumption. Unilateral eyestalk ablation has induced hyperphagia in these prawns. The appetite of these eyestalkless crustaceans may be stimulated by the growth excitatory hormone in *M. nobilii*. Eyestalk extirpation releases the prawn from that regulation thereby increasing the the titre of growth excitatory hormone in blood and hence the animal is induced to take more food and grow larger with an enhanced growth efficiency.

It is also worth mentioning that though food intake is 1.1 times higher in the ablated group, growth efficiency is 1.5 times higher and the extra feed-cost due to increased food consumption is compensated or rather profited by the enhanced growth efficiency. Hence eyestalk ablation prevails as a recommendable technique to prawn farming.

Financial assistance from ICAR, New Delhi is gratefully acknowledged.

27 May 1985; Revised 26 August 1985

1. Conte, F. S., In: *Drugs and food from the sea—Myth or reality*, (ed.) P. N. Kaual and Sinderman. Academic Press, New York, 1978.
2. Muthu, M. S. and Laxminarayana, A., *Proc. Symp. Coastal Aquaculture*, 1982, **1**, 16.
3. Abramowitz, R. K. and Abramowitz, A. A., *Biol. Bull.*, 1940, **78**, 179.
4. Passano, L. M., In: *The physiology of Crustacea*, I, (ed.) T. H. Waterman, Academic Press, New York, p. 473.
5. Mauviot, J. C. and Castell, J. D., *J. Fish. Res. Bd. Can.*, 1976, **33**, 1922.
6. Pandian, T. J. and Balasundaram, C., *Int. J. Invertebr. Reprod.*, 1982, **5**, 21.
7. Katre, S. and Reddy, S. R., *Aquaculture*, 1977, **11**, 247.
8. Ponnuchamy, R., Reddy, S. R. and Shakuntala, K., *Hydrobiologia.*, 1980, **77**, 77.
9. Vijayakumaran, M. and Radhakrishnan, E. V., *Indian J. Fish.*, 1984, **31**, 148.

EFFECT OF *BACILLUS SUBTILIS* ON THE GROWTH OF VASCULAR WILT FUNGI

A. R. PODILE and H. C. DUBE*
Department of Biosciences, Sardar Patel University, Vallabh Vidyanagar 388 120, India.
* *Present address: Department of Life Sciences, Bhavnagar University, Bhavnagar 364 002, India.*

BIOLOGICAL control of plant pathogens, free from hazards, is a difficult but important necessity. Among the various bacterial antagonists tried *Bacillus subtilis* and some species of *Pseudomonas* have been reported to control several plant diseases including plant wilts[1-8]. They are used for soil treatment, seed treatment or as aerial spray. To bring wilt diseases under adequate control, application of biocontrol and development of new techniques are necessary[9]. We have earlier reported the inhibitory effect of two isolates of *B. subtilis* on fungal wilt pathogens *viz Verticillium albo-atrum*, *V. dahliae*, *Fusarium udum* (two isolates), *F. oxysporum* f. sp. *lycopersici*, *F. oxysporum* f. sp. *vasinfectum*, and *Ophiostoma ulmi* (= *Ceratocystis ulmi*)[10]. However, a bacterial wilt pathogen *Pseudomonas solanacearum*, was unaffected by *B. subtilis*. The present work investigates the effect of concentrated cell-free culture filtrate of *B. subtilis* on the growth of some vascular wilt fungi.

Fungal wilt pathogens are the same as used earlier and *B. subtilis* is the same as AF_1, the potential antagonist[10].