

Figures 1 and 2. 1. Infected leaf showing typical mosaic symptoms, and 2. Electron micrograph of virus particles ($\times 50,000$).

zation of the virus are in progress. This is the first record of a virus disease in betelvine in India or elsewhere.

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1. Brandes, J., *Proc. 4th Conf. Potato Virus Diseases*, Braunschweig, 1960, p. 170.

EFFECT OF RAPE-SEED MEAL ON THE LONGEVITY OF *ZAPRIONUS PARAVITTIGER* (DIPTERA)

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AGEING is greatly influenced by a wide range of factors of which nutrition is of prime importance. Various components of diet affect the longevity of

different organisms^{1,2}. Rape-seed, an unconventional dietary source, contains about 40% oil and yields a supplement containing about 38% protein³. However, the presence of glucosinolates and myrosinase enzyme limits its utilization⁴. The present communication deals with the effect of rape-seed meal (RSM) on the longevity of banana fruit-fly, *Zaprionus paravittiger*.

Z. paravittiger flies were reared at $26 \pm 2^\circ\text{C}$ on standard corn meal agar (CMA) medium⁵. Seeds of *Brassica campestris* were cleaned, crushed and extracted by soxhlet using petroleum ether (b.p. $60-80^\circ\text{C}$). The meal was dried ($60-70^\circ\text{C}$; 6 h) and substituted for yeast granules and maize powder. The percentage composition of the experimental media containing RSM, brown sugar and corn starch was RSM I-0.9 (0.3% protein), 1.8, 0; RSM II-1.4 (0.5% protein), 4.1, 0; RSM III-1.4 (0.5% protein), 4.1, 2.9 respectively, the rest of the ingredients being the same as in the standard medium. The flies of the control group were fed continuously with CMA medium throughout their development as well as adulthood. Correspondingly, the flies of

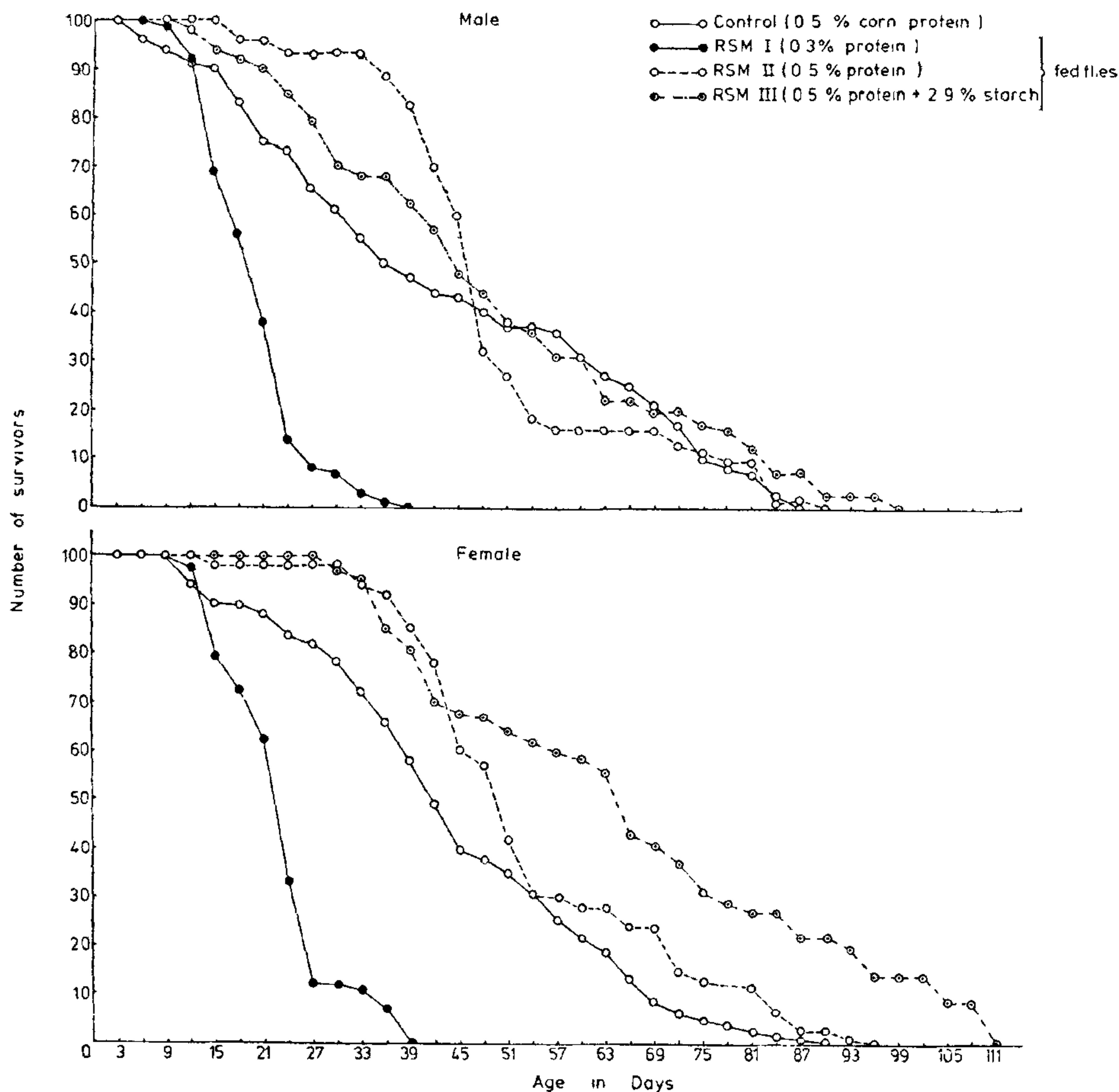


Figure 1. Survival curves of male and female *Z. paravittiger*.

the above test groups were fed with respective RSM media. Life table analysis was carried out from the daily record of the survival and death⁶.

The median (LT_{50}) and maximum (LT_{100}) life spans (the mean number of days when 50 and 100% individuals of the population were dead) of flies fed with CMA medium (0.5% corn protein) were 40 and 84 days for males, and 41 and 87 days for females respectively. The effect of RSM on the longevity of both sexes of banana fruitfly is shown in figure 1. The RSM I (0.3% RSM protein) feeding to flies resulted in decreased longevity, viz. 57.8,

57.1% of control for male, and 54.4, 58.6% for female median and maximum life spans respectively. Such decrease in the longevity may be due to dietary carbohydrate and protein deficiency⁶. The RSM II (0.5% RSM protein) resulted in 17.6 and 7.1% increase for males, and 24 and 6.9% for females LT_{50} and LT_{100} respectively. The effect was even more pronounced with RSM, III (0.5% RSM protein + 2.9% corn starch) feeding.

The increased longevity observed due to balanced RSM feeding to flies can be attributed to its high protein as well as mineral content⁴. It is suggested

that RSM does not have any toxic influence on longevity of the flies when provided in the appropriate proportions with carbohydrates. This may be because the insect has a detoxification mechanism or the enzyme myrosinase is inactive in the insect. Such a suppression of toxic effects of RSM-gluco-sinolates is interesting in the insect system and requires further study.

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1. Brizee, K. R., Eddy, D. E., Harman, D. and Orthy, J. M., *Age*, 1984, 7, 9.
2. Davies, J., *J. Gerontol.*, 1975, 30, 294.
3. Bell, J. M., *J. Anim. Sci.*, 1984, 58, 996.
4. Clandinin, D. R. and Robblee, A. R., *J. Am. Oil Chem. Soc.*, 1981, 58, 682.
5. Wadhwa, R. and Sharma, S. P., *Exp. Gerontol.*, 1984, 19, 199.
6. Lamb, M. J., *Biology of ageing*, Blackie and Sons Ltd., Bishopbriggs, Glasgow, 1977, p. 26.

OCCURRENCE OF MULTIPLE PERFORATION PLATE IN THE VESSEL ELEMENTS OF *CALAMUS* (LEPIDOCARYOIDEAE)

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THE type of perforation plate of tracheary elements plays an important role not only in phylogeny and taxonomy but also in efficiency and safety of

water conduction in seed plants¹. Monocotyledons particularly palms received relatively little attention of anatomists to examine the vessel perforation plates. According to Cheadle², vessel members with simple perforation plates are the most specialized and those vessel members with long scalariform plates are the most primitive. Based on the perforation plate character, chamaedoreoid and iriarteoid palms are considered to be "least specialized"; the arecoid, nypoid and phoenicoid palms to be "unspecialized"; the caryotoid, cocosoid, coryphoid and nonscandent lepidocaryoid palms to be "moderately specialized" and the borassoid and scandent lepidocaryoid palms to be "most specialized"³. Tomlinson⁴ reported that end wall of tracheary element in stem and root of the genus *Calamus*, a lianoid lepidocaryoid palm, is simple and transverse in contrast to the scalariform and oblique type in leaf. Klotz³ supported the view that the lepidocaryoid lianas, being the most specialized group, have simple perforation plates in the stem in contrast to the occurrence of multiple, mixed multiple and simple or simple perforation plates in the stem of lepidocaryoid palms.

The purpose of this paper is to present the anatomical observations on the form of vessel perforation plates of nine *Calamus* species (lepidocaryoid lianas) growing in Kerala forests (table 1). For each species, basal most internode was selected from two stems and small slivers were cut from inner two third of the cylinder in the middle portion of the internode for the maceration of tissues using 1:1 hydrogen peroxide and acetic acid mixture. Macerated cells were stained with Heidenhain's haematoxyline using iron alum as mordant after

Table 1 Specimens examined for stem anatomy of *Calamus* growing in Western Ghats in Kerala

Species	Locality	Identification/collection No.	Per cent of vessel elements with scalariform perforations
<i>Calamus dransfieldii</i> Dhoni, Renuka	Palghat	Renuka 2982:16.12.1983	-
<i>C. gamblei</i> Becc.	Pamba (Kakki) Ranni	Renuka 3173:24.5.1984	-
<i>C. hookerianus</i> Becc.	Nelliampathy	Renuka and Muktesh 2727:6.1.1983	4
<i>C. meizianus</i> Schlecht.	Nilambur	Renuka 3061:27.3.1984	-
<i>C. pseudotenuis</i> Becc.	Peermedu	Nambiar and Renuka 2625:24.11.1982	2
<i>C. rotang</i> Linn.	Quilon Asram	Renuka and Sasidharan 3443:18.1.1985	-
<i>C. thwaitesii</i> Becc.	Achenkovil	Nambiar and Renuka 2903:8.2.1983	3
<i>C. travancoricus</i> Bedd.	Arienkavu	Nambiar and Renuka 2925:19.4.1983	5
<i>C. vattayila</i> Renuka	Thenmala	Renuka 4003:11.10.1985	-

- = Not found.