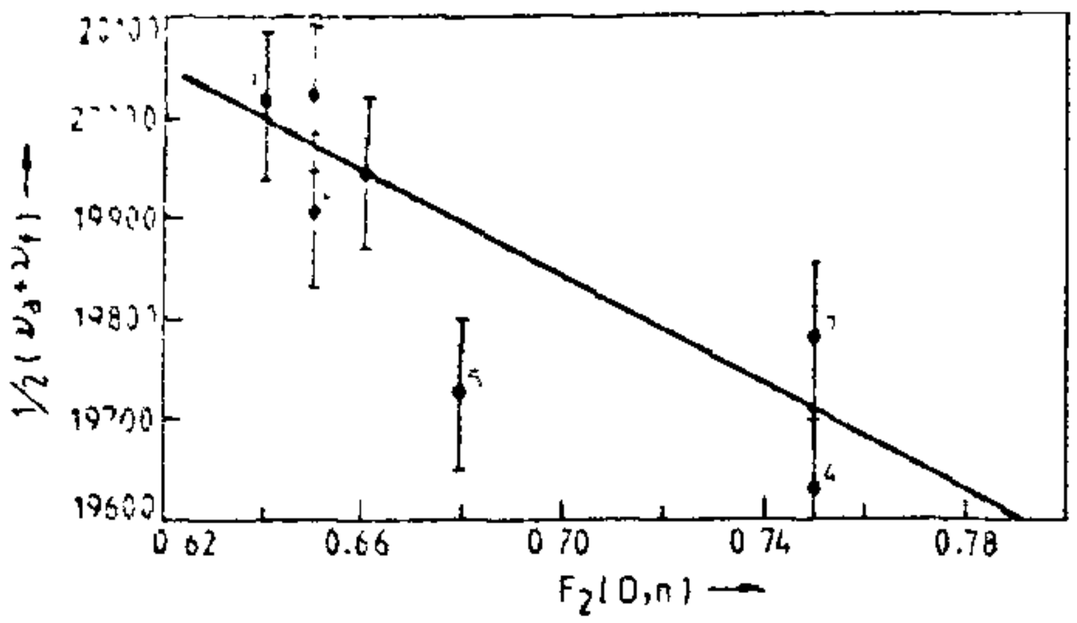

Figure 2. $\frac{1}{2}(\bar{\nu}_a + \bar{\nu}_f)$ *vs* $F_2(D, n)$

These plots are linear with slopes $S_1 = 1315$ and $S_2 = -2647$. The ratio of the dipole moments in the excited state and the ground state is given by:

$$\mu_e/\mu_g = (S_1 - S_2)/(S_1 + S_2) \sim 3{\cdot}0$$

$$\text{i.e. } \mu_e \sim 3\mu_g.$$

The excited state dipole moment of euchrysine is higher (almost three times) than the ground state dipole moment. This change in dipole moment on excitation is not very large. This could be explained from the resonance structure of euchrysine molecule (figure 3). Only structures I and II can possibly be expected to contribute to a change in dipole moment due to heterogeneous accumulation of charge on the amino groups. The other resonance structures *viz* III and IV, have a homogeneous charge distribution and would not cause much change in the dipole moment. The structure also suggests the possibility of hydrogen bonding in polar solvents *via* the electron pair available on the NH_2 group. This along with some other possible specific interactions could contribute to the deviation of the Stokes' shift from the linear relationship. Such effects have not been considered in the theoretical treatment of the solvent-solute interaction[2-4]. Also it may be noted that relation (1) is obtained on the assumption that the electric dipole moments in the ground and excited states, μ_g and μ_e are parallel. This may or may not be so in this case. Even within the framework of these limitations one finds a good agreement between the experimental results and theory.

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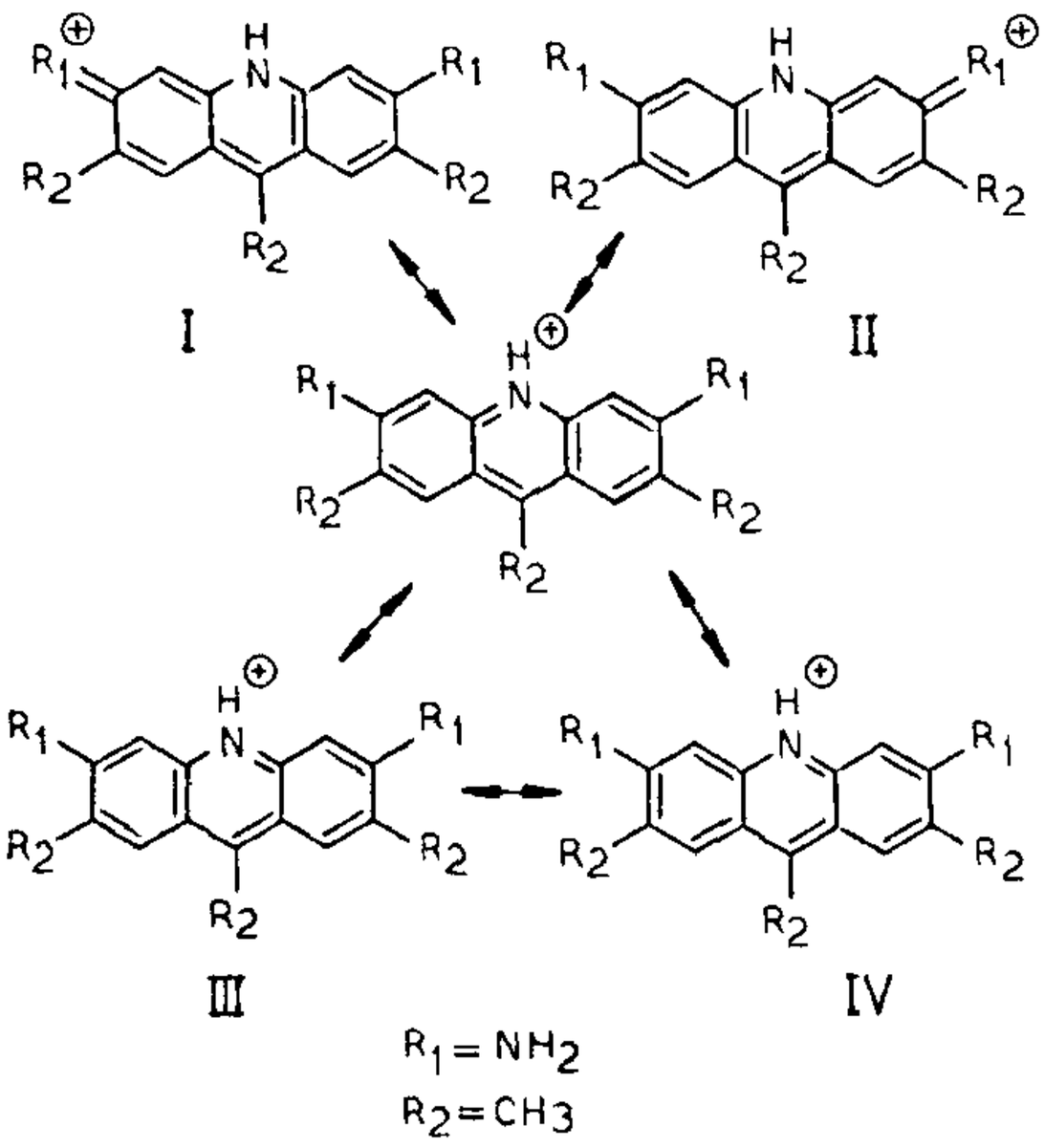

Figure 3. Resonance structures of Euchrysine.

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ANTIFEEDING PROPERTIES OF *SWERTIA CHIRATA* AGAINST JUTE SEMILOOPER (*ANOMIS SABULIFERA* GUEN)

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MANAGEMENT of crop pests with antifeedants of plant origin is still in an experimental stage in India. Some indigenous plants were reported to have effective antifeeding properties against crop pests[1-5]. *Anomis sabulifera* was first recorded in 1906[6] as a major pest of jute and a lot of work[7-11] was done on different control measures against this pest. However

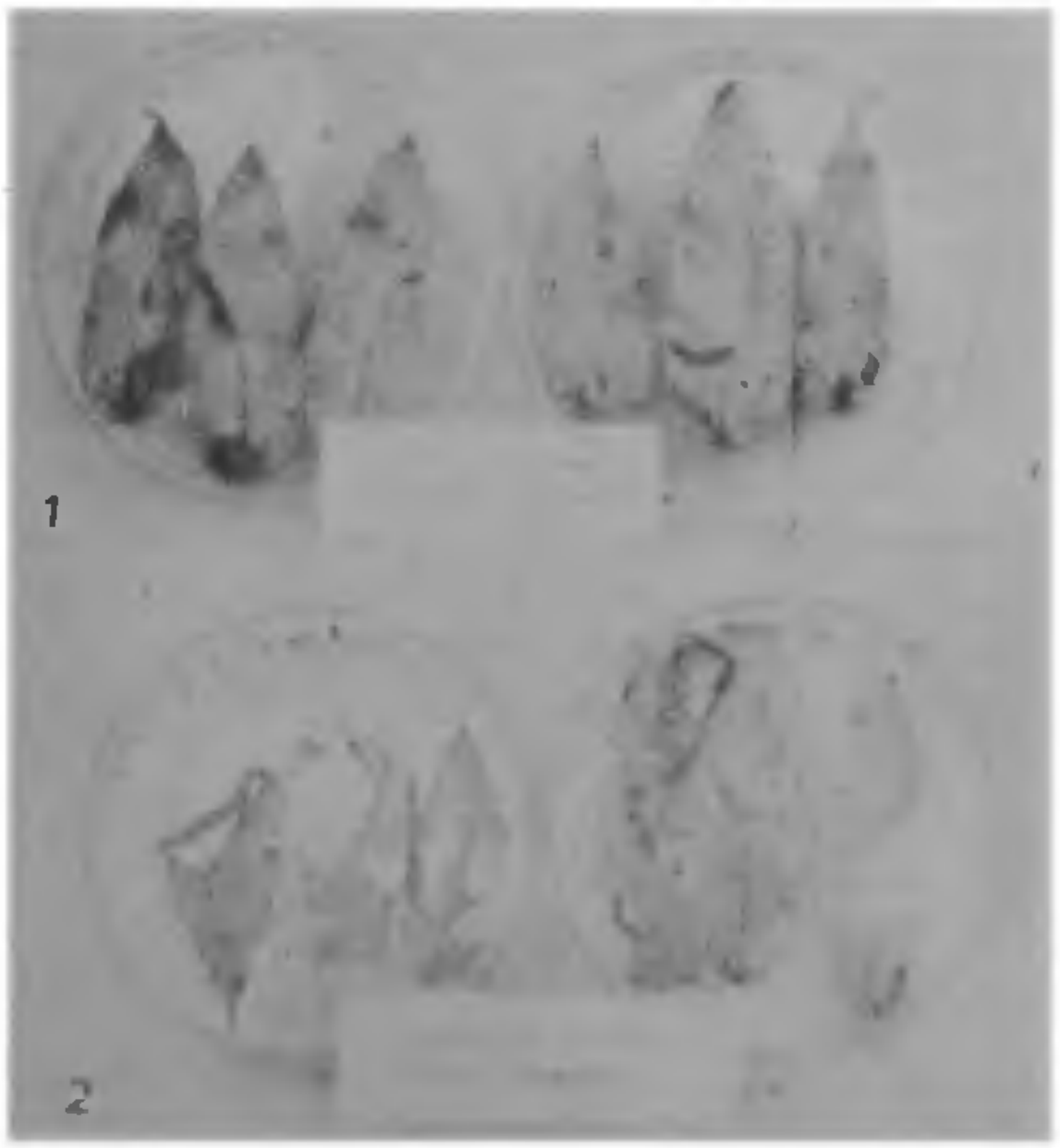
studies on any antifeedant of plant origin for the management of this pest are few. The use of organic and inorganic insecticides involves heavy cost and operational and residual hazards whereas botanical compounds are free from such risks. *Swertia chirata*, commonly known in India as *Chireta* is bitter in taste and has gained medicinal importance[12]. In this investigation preliminary studies were conducted under laboratory conditions with different extracts of *S. chirata* to assess their antifeeding effects against *A. sabulifera*.

Ethylacetate extract, methanol extract and benzene extract of *S. chirata* were taken to assess their antifeeding properties under laboratory conditions against the last instar larvae of *A. sabulifera*. All extracts were diluted to concentrations of 10, 5, and 1% with acetone as solvent and triton 100 as emulsifier at a constant level of 5% and 0.5% respectively. Healthy, green leaves of *Corchorus olitorius* L (JRO 632) were collected from field grown under special care. Leaves were washed thoroughly in tap water and dried under electric fan. Three such leaves were placed in each petridish. All the extracts, at the above mentioned concentrations, were sprayed on both sides of the leaves placed on the petridish using Potter's Tower at 10 lb psi. One ml of spray material of each concentration of each extract was sprayed every time. Each concentration was replicated thrice. The treated leaves were carefully dried under electric fan and then thick wet blotting papers were put under the leaves to keep them green for a longer period. The last instar larvae of *A. sabulifera* reared on the same variety of jute leaves in the laboratory, were starved on the previous night and two such larvae were then released on the treated leaves inside the petridish which was then covered with another petridish to prevent the larvae from escaping. In control, leaves were simply washed in tap water, dried and similarly kept inside the petridish with a pair of larvae. Observations on the consumption of leaf area by one pair of larvae were recorded with planimeter after 24 hr of spray. Residual antifeeding effect of ethyl acetate extract of *S. chirata* was tested for four days at 10% concentration by similar spraying. Larvae released in the treated leaves for assessing the residual effect, were replaced by a new pair of starved larvae every 48 hr because most of the larvae either became very weak or died due to non-feeding. In control, all leaves were consumed totally, hence a fresh pair of leaves was given every 24 hr.

Antifeeding property of each concentration of each extract was judged by comparing the leaf area consumed by one pair of larvae in 24 hr with that of control. Among the treatments, ethyl accetate extract of *S. chirata* at 10% concentration showed a promising antifeeding effect against *A. sabulifera*. Data on the

Table 1 *Antifeeding test in petridish*

Treatment		Total Leaf area consumed by one pair of Larvae in 24 hr in 3 replications. $(cm)^2$	Average leaf area consumed by one pair of larvae in 24 hr $(cm)^2$
Ethyl accetate extract.	10%	0.00	0.00
	5%	25 50	8.50
	1%	60.00	20 00
Methanol extract	10%	98.70	32.90
	5%	122 60	40 86
	1%	138 00	46.00
Benzene extract	10%	101.50	33.83
	5%	120 00	40 00
	1%	142.50	47 50
Control		145.60	48.53
SE (M)			1.58
CD 5%			4 693
CD 1%			6 429



Figures 1, 2. 1. Treated jute leaves completely undamaged by *A. sabulifera*. **2.** Untreated (normal) jute leaves heavily damaged by *A. sabulifera*.

consumption of leaf area by a pair of larvae presented in table I show that the larvae of *A. sabulifera* do not feed on the jute leaves when ethyl accetate extract of *Swertia chirata* is sprayed at 10% concentration (figure 1) against 48.53 sq cm consumption in control by a pair of larvae in 24 hr (figure 2). This extract has no phytotoxic effect on leaves. In residual antifeeding test, it was observed that the larvae did not cause damage to any part of the treated leaves upto 4 days even when the larvae were replaced by a new pair of starved larvae every 48 hr. Some of the larvae moving on the treated leaves died after 48 hr due to non-feeding.

Further investigations are in progress to isolate the active ingredient which acts as antifeedant against this pest for testing under field conditions. Residual anti-feeding effect of the compound for 4 days will force the pest to leave the treated field in search of food as they will otherwise succumb to starvation.

14 May 1985

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MITODEPRESSIVE AND CLASTOGENIC ACTIVITY OF 2-MERCAPTO-6-METHYL-PYRANO-[2, 3-e]BENZOXAZOL-8(H)-ONE IN *ALLIUM SATIVUM*, L.

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OXAZOLES are gaining prominance in the field of chemotherapy[1]. They were also applied as analgesic[2], antiviral[3], antibacterial[4] and antifungal[5] agents. However, no attempt was made to study the effects of oxazoles on the cytology and cell division. This paper reports the cytological changes produced by the newly synthesized compound 2-mercapto-6-methylpyrano [2,3-e]-benzoxazol-8(H)-one (MMB) in the somatic cells of *Allium sativum*, L.

Healthy root tips from growing bulbs of garlic were treated with freshly prepared solution of MMB at concentrations 0.05, 0.1, 0.2 and 0.5% for 2 hr duration and then allowed to recover for 24, 48 and 72 hr, by growing in distilled water to assess the nature and extent of damage caused by the treatment over three cell division cycles. Since the compound was not soluble in distilled water, acetone was used as the solvent. Comparable controls were maintained by treating the bulbs with acetone. After the termination of treatments and recovery, the bulbs were washed thoroughly with distilled water, harvested (10 root tips from each treatment) along with the control and fixed in 1 : 3 acetic alcohol. Cytological preparations were made by using 2% aceto-orcein.

The spectrum and frequency of abnormalities elicited by MMB are presented in table 1. The frequency of mitotic index in 2000 cells, taken randomly from different areas of ten slides from the control and treated root tips was determined. In control 13.7 percentage of dividing cells were recorded, while the different treatments of MMB were found to decrease the rate of cell division (table 1). The seedlings exposed to 0.05% of MMB did not show any significant effect, however the higher concentration treatments (.2 and .5%) produced strong antimitotic effects and all the stages of mitosis decreased simultaneously. Though, mitotic index did not recover to the level of control with the recovery periods allowed. There was a gradual increase in the frequency of chromosomal aberrations with increase in the concentration of