

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 acetate 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 antifeeding 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.

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

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OXAZOLES are gaining prominence in the field of chemotherapy¹. They were also applied as analgesic², antiviral³, antibacterial⁴ and antifungal⁵ 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.

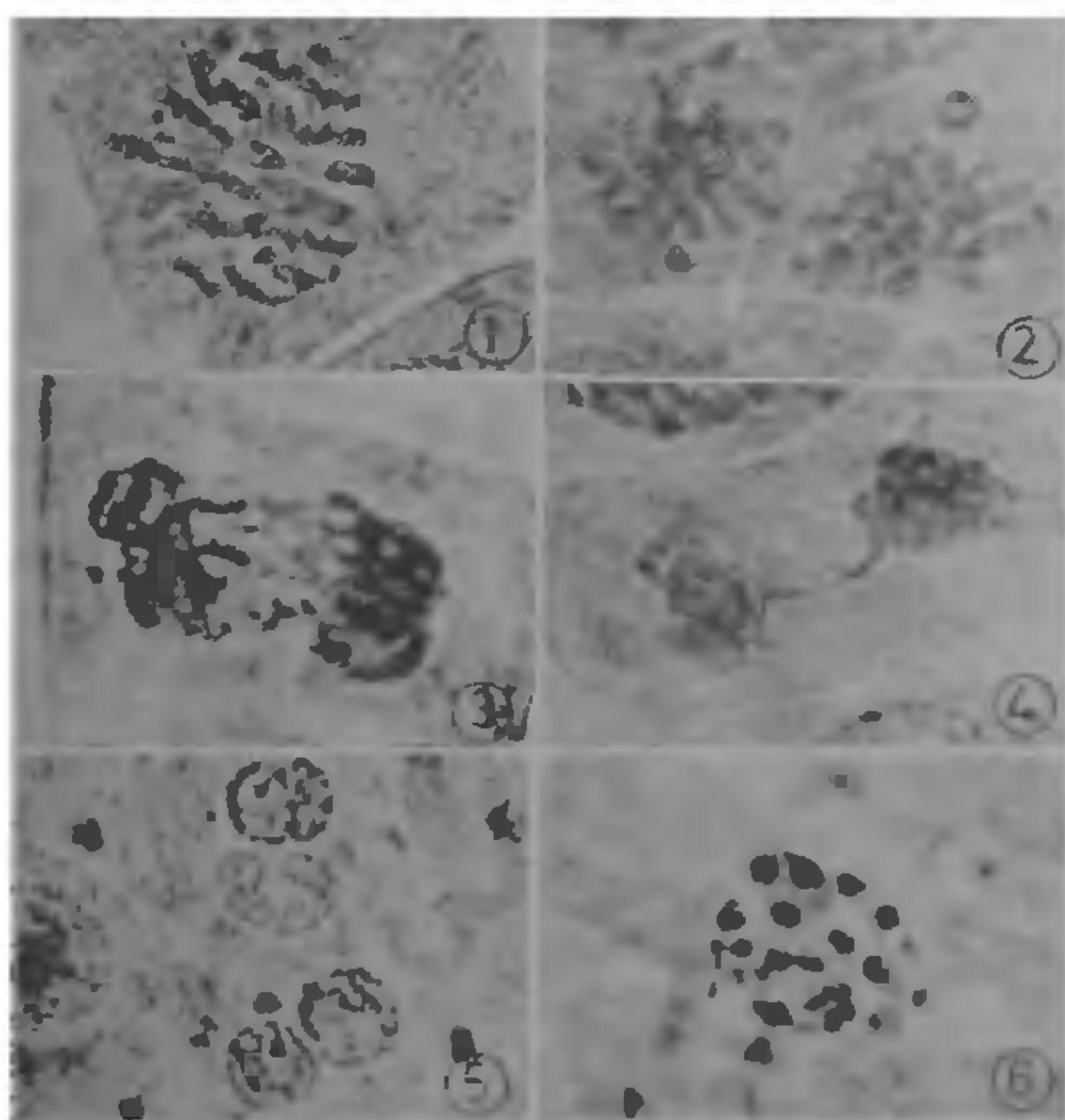
Healthy root tips from growing bulbs of garlic were treated with freshly prepared solution of MMB at concentrations 0.05, 0.1, 0.2 and 0.5% for 2 hr duration and then allowed to recover for 24, 48 and 72 hr, by growing in distilled water to assess the nature and extent of damage caused by the treatment 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

Table 1 Effects of MMB on cell division and clastogeny in (%) of *Allium sativum* L.

Treatment	Mitotic index	Metaphase		Anaphase		Telophase			
		Stickiness	Fragments	Stickiness	Bridges	Stickiness	Bridges	Fragments	
Control	13.60	0.98	0.12	0.56	—	—	0.68	—	—
0.05	12.86	4.57	0.92	1.23	4.2	0.62	0.85	2.8	—
0.1	9.32	6.92	1.78	4.62	6.78	2.2	1.60	3.2	0.56
0.2	5.86	12.75	5.48	9.33	3.55	9.60	4.87	—	1.02
0.5	2.42	16.84	6.24	11.52	0.82	11.20	6.22	—	2.80

chemical. The most frequent abnormality was stickiness of chromosomes. Other aberrations observed were chromosomal breaks (figure 1), bimetaphase with sticky chromosomes (figure 2), chromosomal bridges at anaphase and telophase (figures 3 & 4) with fragments and laggards, polyploidy (figure 5) and the formation of chromocentric nuclei (figure 6) at higher concentrations due to the intranuclear clumping of chromatin material. In the recovery series, the aberration frequency and spectrum progressively declined from 24 to 72 hr of recovery period. However, the aberrations like stickiness, bridges and laggards persisted at higher concentration treatments.



Figures 1–6. *Allium sativum* × 3120. 1. Broken metaphase. 2. Sticky bi-metaphase. 3. Late anaphase with broken bridges. 4. Telophase bridge. 5. Tetra-nucleate cell. 6. Chromocentric nucleus.

The chemical MMB appears to have profound effect on dividing cells and chromosomes as revealed in the present study. The linear decrease in the mitotic index with increase in the concentration indicates that the chemical MMB has mitodepressive action. The failure of mitotic index to revive after allowing recovery time of three cell division cycles shows that the chemical has mitostatic effects⁶. Occasional occurrence of polynucleate cells may be due to the inhibition of cytokinesis and the predominance of stickiness indicates the toxicity of the chemical at the chromosomal level. Whereas, the chromosomal breaks induced by the MMB were non-randomly distributed and non localized. It has been suspected that the chromatid breaks are inflicted after the chromosome reproduction, very likely at the G₂ or late S phase of DNA synthesis and chromosome type in G₁ phase. In the present investigation it was suggested that MMB could be a mutagenic agent since the compound is capable of inducing clastogeny and interaction with DNA synthesis⁷. Regarding the possible mechanism of action on chromosomes, it appears that it might be disturbing the nucleic acid metabolism resulting in hazards in protein reduplication causing the chromosomes to break at different loci⁸.

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EVIDENCE PREDICTING EXISTENCE OF TRIONYCHID TURTLES IN THE INTERTRAPPEAN ROCKS OF SAURASHTRA (GUJARAT STATE)

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INTER-TRAPPEAN beds of sedimentary origin are known to occur at short intervals between the successive phases of Deccan Trap lava eruption. These beds

are usually of fluvial or lacustrine origin and are significant from the view point that when fossiliferous, they provide clues to the history of eruptive quiescence that intervened between the successive outbursts and of the animals and plants that time and again migrated to these centres¹.

The occurrence of such inter-trappean beds in Saurashtra is known since the geological report of Kathiawar was published, a century ago². These rocks, fluvial and lacustrine in origin, contain vertebrate fossils including those of the fish *Horachupae intertrappean*, *Palaeopristolepis feddeni* and *Palaeopristolepis Chiplonkari*³⁻⁵.

Good exposures of such inter-trappean beds in Saurashtra can be located between Bamanbor (22° 24' 55" N, 71° 2' 27" E); and Chotila (22° 25' 12" N, 71° 11' 36" E) along the main road leading towards Rajkot, (Location Map - figure 1). These beds, Upper Cretaceous to Lower Palaeocene in age⁶, and some fifteen to twenty feet in vertical thickness, are highly crumpled, grey, brownish, yellowish earthy shales interstratified within the trap flows. Recent acquisition of the fossil fragments belonging to the family Trionychidae

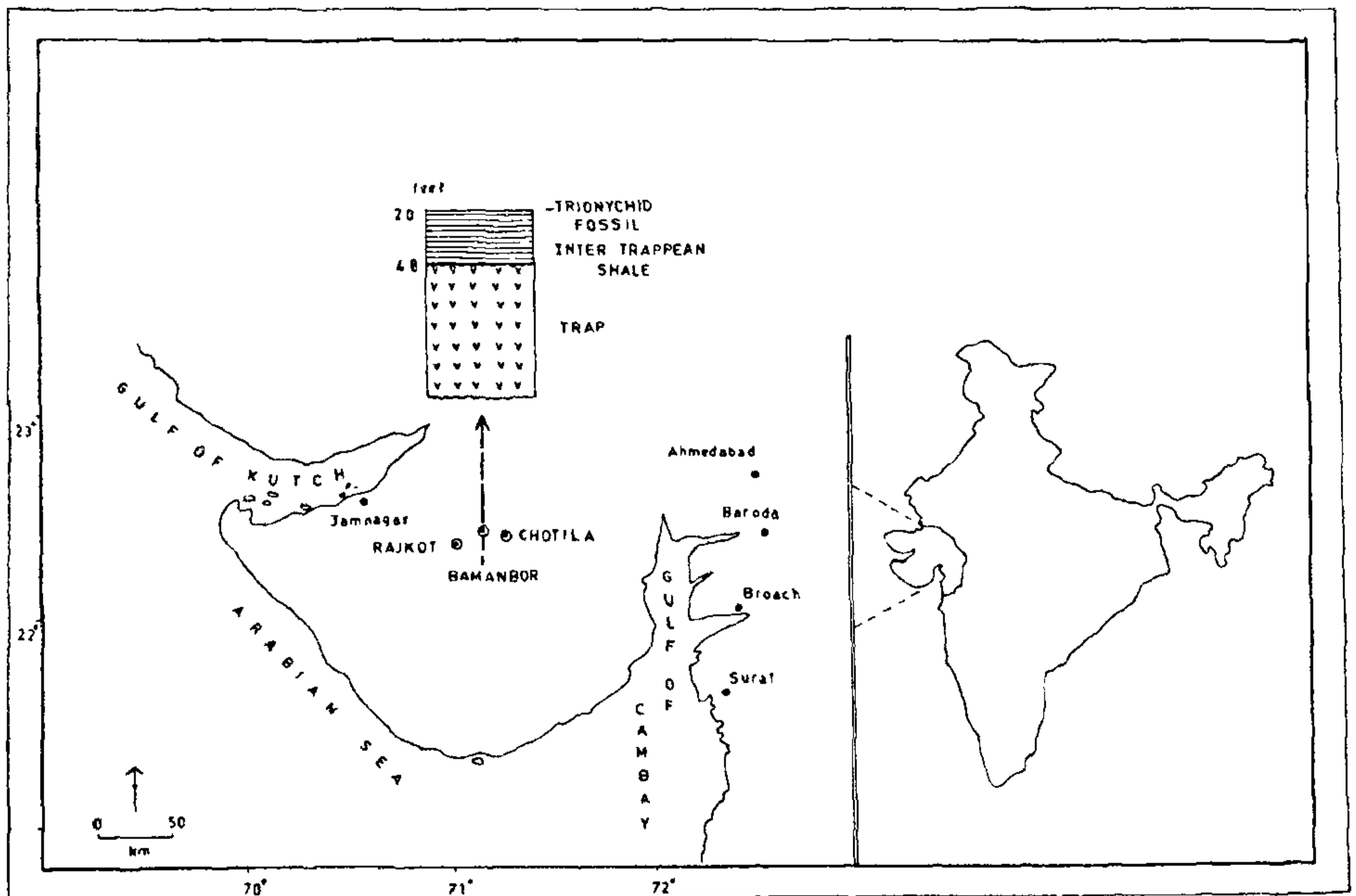


Figure 1. Location and index map with lithocolumn and fossil locality.