economically important cucurbitaceous crops and the pathogen over winters on this perennial weed host.

In our studies, based on the symptoms and sensitivity to oxy-tetracycline hydrochloride, the phyllody on the five cucurbitaceous hosts may be assigned tentatively as due to mycoplasma-like organisms. From Tamil Nadu, Narayanaswamy *et al.*,[1] Nagarajan[2], Rajasekhara Mudaliar and Girija Lakshman[3] reported mere occurrence of phyllody disease only on *M. charantia*, *T. anguina* and *L. acutangula*. In the present studies in addition to this three hosts reported from Tamil Nadu, three more hosts like *C. melo*, *L. vulgaris* and *M. maderaspatana* are reported as hosts of phyllody disease. Earlier, Chou *et al.*[4] from Taiwan reported graft transmissible disease on bottle gourd, chayote, balsam-pear and ridge gourd, which were exhibiting witche's-broom symptoms, and produced many flowers, which blossomed earlier than the healthy plants and is different from the present report.

A perusal of the bibliography of plant virus and mycoplasmal diseases in India[5] revealed that there is no record of this disease on *C. sativus*, *L. vulgaris* and *M. maderaspatana*. The occurrence and relationship with the phyllody diseases on other cucurbitaceous hosts is reported in this communication.

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CHEMICAL ANALYSIS OF *URGINEA INDICA* (ROXB.) KUNTH. CYTOTYPES

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Introduction

Chemical analysis of intra-specific variations based on botanical characterization is an essential prerequisite for the breeding programme of the species. *Urginea indica* is an important medicinal plant in modern therapeutic medicine. As it is highly heteromorphic, its natural population exhibits a variety of phenotypes and cytotypes[11,12]. Cytotypes of *U. indica* under the present investigation include diploids and naturally occurring polyploids. So far no systematic chemical analysis of *U. indica* cytotypes has been carried out in order to ascertain any possible differences related to polyploidization itself.

Materials and Methods

Seven different morphologically unique cytotypes of *U. indica* were collected from Guhagar, Ratnagiri, Vengurla, Karwar, Ravanfond (Goa), Vengurla and Aurangabad, respectively. These cytotypes were studied karyomorphologically and the Nos. 1–4 (from Guhagar, Ratnagiri, Vengurla, and Karwar, respectively) were reported as diploid ($2n = 20$); Nos. 5–6 (from Ravanfond and Vengurla, respectively) as triploids ($3n = 30$), and No. 7 (from Aurangabad) was a tetraploid ($4n = 40$).

Uniformly matured bulbs of these cytotypes were washed and used for different estimations.

Carbohydrates (sugars) were estimated by the usual titration method of Sommogyi Nelson[9]. The mucilage and sizing-gum contents were determined by the methods given by Beri and Pharasi[1] and Seth[13], respectively. The proteins were estimated by the method given by Hawk *et al.*[4].

For the estimation of total glycosides the membranous outer scales were removed, the fleshy inner scales were sliced and used for extraction with ethyl acetate[15] and the solvent evaporated. The residue was dissolved in methanol and used for the spectrophotometric estimation of total glycosides[5].

Results and Discussion

Triploid (Nos. 5 and 6; from Ravanfond and Vengurla) and tetraploid (No. 7, from Aurangabad) cytotypes of *U. indica* are naturally occurring polyploids.

According to Stebbins[14] nearly all natural polyploids (perhaps all) are intermediates to the categories of strict alloploids and strict autoploids.

On biochemical examination of 7 cytotypes of *U. indica* it is quite evident that there exists a large variation in chemical contents in diploids and polyploids.

Cytotype No. 5 (triploid from Ravanfond) had a maximum concentration of one of the most important active principle, namely total glycosides (0·96%) besides proteins (5·98%) and sizing-gum (12·38%). Cytotype No. 6 (triploid from Vengurla) ranked second as far as the amounts of proteins (2·63%) and sizing-gum (11·75%) are concerned (Table 1).

TABLE I

Showing carbohydrates, mucilage, sizing-gum, proteins and total glycosidal contents in different cytotypes of U. indica

Cytotype No.	Carbohydrates		Mucilage	Sizing-gum	Proteins	Total glycosides
	Reducing sugars	Total sugars				
1 (Diploid)	0·32	2·50	16·27	8·48	0·47	0·76
2 (Diploid)	0·07	1·98	12·32	7·23	1·17	0·54
3 (Diploid)	0·31	1·39	9·88	8·26	0·55	0·44
4 (Diploid)	0·86	4·82	11·21	4·65	1·60	0·29
5 (Triploid)	0·43	3·41	13·64	12·38	5·98	0·96
6 (Triploid)	0·46	2·56	11·79	11·75	2·63	0·69
7 (Tetraploid)	0·11	2·40	14·18	7·25	0·93	0·43

Note: All the results are given as the mean values of three determinations and are expressed in g/100 g of fresh plant material.

Cytotype No. 5 (from Ravanfond, Goa) also gave an excellent performance regarding its growth and other morphological characters. This might be due to the combined gigantism of polyploidy with heterotic effects of the involved hybridity[6]. Noggle[10] in a review of the literature on the physiology of polyploids indicated that the amounts of some chemical constituents could be altered by increasing chromosome numbers. Yet there is evidence from gene dosage studies that non-additive effects occur in some polyploids. Carlson[2] found that the presence of an addition gene increased the overall rate of transcription and resulted in an increase in enzyme activity in *Solanum*.

Amongst the cytotypes numbering 1–4 (diploid), the cytotype No. 1 (from Guhagar) contained maximum amount of total glycosides (0·76%), sizing-gum (8·48%) and mucilage (16·27%). A considerable variability in the chemical contents has been observed and this indicated their separate entities within the species.

Cytotype No. 7 (tetraploid from Aurangabad) had very poor chemical contents as compared to even its diploid ancestors. This was probably due to its less vigour in growth.

Haskell[3] compared the phenolics of colchicine-induced tetraploids of two diploid strains of raspberry to the phenolics of two spontaneous autotetraploids that arose apparently from root-cutting. The spontaneous tetraploids produced fewer phenolics than the diploids.

Levin *et al.*[7] have also studied enzyme (alcohol dehydrogenase) activity in diploids, induced tetraploids of six *Phlox drummondii* cultivars and natural tetraploid (wild type). About twice as much alcohol dehydrogenase specific activity was detected in the autotetraploids as in the diploid cultivars. In the natural tetraploid (wild type) there was a slight decease in specific activity. Nakai[8] found increased esterase activity in 17 of 29 tetraploids compared to the diploids.

A review of the present study clearly indicates that the cytotypes No. 1 (diploid collected from Guhagar) and No. 5 (triploid collected from Ravanfond) of *U. indica* can be recommended for large-scales cientific cultivation and mutation breeding programme for crop improvement as they are with better cheimcal contents.

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A NEW FUNGAL DISEASE OF *VERNONIA DIVERGENS*

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During a recent survey an unrecorded leaf spot disease was observed on plants of *Vernonia divergens* Edgew. growing in the botanical garden of Jiwaji University. The disease occurred from July (1979)–February (1980). Initially the leaf spots were small, circular with distinct concentric rings and 0·5–2·2 cm in diameter but later became irregular giving blighted appearance to the leaves.

The pathogen was isolated on P.D.A. following surface sterilization technique.

Mycelium of the fungus in culture branched, septate, brownish black in colour, 3·3–6·4 μm broad; conidia muriform, deep brown, forming in short unbranched chains on simple conidiophores, 46–53·5 × 24–27 μm; beak generally absent if present, septate, measuring 2·6–4·5 × 3–3·9 μm. The fungus was identified as *Alternaria alternata* (Fr.) Keissler. Identity of the fungus was later confirmed by C.M.I. (I.M.I. No. 247179).

Pathogenicity of the fungus was tested on healthy leaves using 10 day old, single spore cultures. The characteristic symptoms developed after 6–7 days of inoculation.

A. alternata has a wide range of hosts[1] in India, but occurrence of the fungus on *V. divergens* is the first report for the country.

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ON THE EPIDERMAL FIBRE-LIKE SCLEREIDS IN THE TWO SIBLING GENERA OF THE *POACEAE*

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The occurrence in the two sibling genera of *Phareae*: *Pharus* of the new world and *Leptaspis* of the old world, long epidermal cells that are fibre-like tempted us to re-examine their charcteristic features with a view to elaborate whether they could be treated under sclereids. Furthermore, we felt that precise information about their nature is necessary to avoid the sort of difficulties which can arise when, for instance, the term is easily mistaken for fibres of very different origin.

Materials

Leptaspis urceolata (Roxb.) R. Br. Papua, Normanby isl., Waikaiuna, L. J. Brass 25387 (US); *Pharus latifolius* L., Brazil, Porto Seguro, Itamaraju, T. R. Soderstrom, George F. Russell and Jose Hage 2209 (US).

Leaf sectors were cleared by soaking them in 5% sodium hydroxide overnight at 60° C. Next they are washed in water thoroughly and subjected to trichloroacetic acid–phenol (2: 1) treatment for 10–15 minutes at 60° C[1]. This modified technique is very helpful for clearing tannin and silica bearing leaves.

Studies of the cleared leaf segments, sections parallel and transverse to the main veins revealed two interesting patterns: surface mosaic pattern and cross sectional patterns of sausage or fusoid-shaped translucent *giant cells* in rows (Fig. 1).

The surface pattern has a few anatomical features of distinct morphogenic interest. Most distinctive is the co-occurrence of epidermal cells adjacent to the file of short often long and fibre-like commonly restricted to longitudinal rows[2]. These long cells conform to elongated epidermal cells, single or in doubles, and often vary in their numerical numbers