irregular hard black compact sclerotial bodies form gradually. They are found embedded in the stems and cabbage heads [Plate 1 (1)]. The sclerotial bodies are initially small, solid, white in colour, later turning black with maturity [Plate 1 (2)] resulting in the entire collapse of the cabbage crop.

PLATE 1. (1) Infected Cabbage head and leaf with schrotia embedded. (2) Sclerotia of *Scelrotinia sclerotiorum* (Lib.) DeBy.

Isolation of the pathogen was made from the diseased tissues and tht isolate produced hyaline and highly branched mycelia with sclerotial bodies at 28° + 1° C. Microscopic examination revealed that no true conidia were produced but only microconidia. The sclerotial bodies were highly irregular measuring 2·5 to 8 mm. The isolate was tested for pathogenicity on autoclaved soil in pots raised with cabbage plants.

Young plants exhibited waterly soft lesions near cotyledonary node and germination was highly affected. Inoculation of pathogen on cabbage heads yielded a cottony white fluffy mycelial mat with soft rot symptoms. The pathogen satisfied the Koch's postulates. From the symptom expression of the host, mycelial and sclerotial characters, the present fungus is identified as *Sclerotinia sclerotiorum* (Lib.) DeBy., which is the first record on cabbage in India.

The specimen and a pure culture of the pathogen have been deposited with the Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.

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SYSTEMATIC POSITION OF *BALANITES* DELILE

THE systematic position of *Balanites* has been a matter of controversy. Bentham and Hooker[1] and Cronquist[2] included it in Simaroubaceae while Engler and Prantl[3] placed it under Zygophyllaceae. Hutchinson[4] created a separate family, Balanitaceae, under his Malpighiales along with ten other families.

Though *Balanites* has received attention from such disciplines as anatomy, floral anatomy, embryology and Palynology, its chemistry is little known. The present study has been undertaken to see how far the data from Chemotaxonomy of *Balanites roxburghii* Planch., along with data from other disciplines, would help in establishing the systematic position of *Balanites*. For the sake of comparison the Chemotaxonomy of *Guaiacum officinale* Linn., *Tribulus terrestris* Linn., and *Ailanthus excelsa* Roxb., has also been included.

The materials of *Balanites roxburghii*, *Tribulus terrestris* and *Ailanthus excelsa* were collected locally and the material of *Guaiacum officinale* was collected from the Botanical Garden, Osmania University, Hyderabad. The tests using fresh materials consisting of stems, leaves and fruits and 80% methanolic extracts of entire plants during flowering and fruiting are presented in Table I.

From Table I it will be evident that *Balanites* resembles *Guaiacum officinale*, *Tribulus terrestris* and *Ailanthus excelsa* in the uniformly positive reactions for carbohydrates (Molisch test), phenols, flavonoids, Maule's test and saponins and negative reactions for cigarette test, hot water test, juglone test, syringin test, aurone test 'A', HCN test, Ehrlich test 'A', tannins, indoles and hydroxyquinones'. However, Zygophyllaceae resemble Simaroubaceae in the negative reaction for hot water test, juglone test, HCN test, syringin test and Ehrlich test 'A' and positive reaction for flavonoids (see Gibbs[7]).

Balanites differs from Simaroubaceae in certain important chemical characters. In the presence of saponins, it resembles *Guaiacum officinale*, *Tribulus terrestris* and other investigated taxa of Zygophyllaceae while in Simaroubaceae they are reported to be doubtfully present (see Gibbs[7]). In *Ailanthus excelsa* however, saponins are present.

The positive reaction for Leibermann-Burchard test and negative reaction for Triterpenoids (Noller's test) in *Balanites roxburghii*, *Guaiacum officinale* and *Tribulus terrestris* indicates the probable presence of steroids. Positive results for Salkowski reaction (steroids) in these taxa confirms the presence of steroids. Since the test for saponins is also positive, the substances present may be inferred to be of the nature of steroidal saponins. In Simaroubaceae on

TABLE I

Tests	*Ailanthus excelsa*	*Balanites roxburghii*	*Guaiacum officinale*	*Tribulus terrestris*
Cigarette test	–	–	–	–
Hot water test	–	–	–	–
HCl/Methanol test (Gibbs)	+	–	–	–
Syringin test	–	–	–	–
Maules test	+	+	+	+
Leucoanthocyanin test 'A' (Gibbs)	+	–	–	–
Juglone test 'A'	–	–	–	–
Aurone test 'A'	–	–	–	–
HCN test	–	–	–	–
Saponin test 'A' (Gibbs)	+	+	+	+
Ehrlich test 'A'	–	–	–	–
Hydroxyquinones	–	–	–	–
Saponins	+	+	+	+
Flavonoids	+	+	+	+
Tannins	–	–	–	–
Alkaloids	–	+	–	–
Molisch test	+	+	+	+
Ehrlich test	–	–	–	–
Liebermann-Burchard test	–	+	+	+
Phenols	+	+	+	+
Noller's test	+	–	–	–
Leucoanthocyanins	+	–	–	–
Salkowski reaction	–	+	+	+
Badounis test	+	–	+	–
Labat test	+	–	–	–

the other hand, the probable presence of triterpenoids is indicated by the negative results for Liebermann-Burchard test and positive reaction for Noller's test (triterpenoids). Since the test for saponins is positive in *Ailanthus excelsa* it may be inferred that triterpenoidal saponins are present in this taxon (see also Gibbs[7]).

In the negative reactions for HCl/Methanol test, Labat test, absence of leucoanthocyanins, *Balanites* resembles the members of Zygophyllaceae, more than Simaroubaceae. In the latter taxon the reactions for all the tests are positive.

Thus, from the point of view of chemotaxonomy, *Balanites* is more similar to Zygophyllaceae than Simaroubaceae. However, it differs from both the taxa in the positive reaction for alkaloids.

According to Record[19] *Balanites* differs from the Zygophyllaceous taxa like *Bulnesia, Porlieria* and *Guaiacum* xylotomy. However, it resembles these taxa in features such as vasicentric tracheids, small vessel pitting, thick-walled fibres with bordered pits and abundance of fusiform parenchyma cells[13].

Heimsch[8] considers that *Balanites* shows greater affinity to Zygophyllaceae than Simaroubaceae though it is elsewhere observed that the genus can be separated from Zygophyllaceae on the basis of the height and width of medullary rays.

Balanites resembles Zygophyllaceae in essential embryological features and differs from Simaroubaceae in the smaller number of parietal layers, absence of nucellar cap and presence of endothelium (see Davis[1,11,12,14,15,17,18]). Johri[10] also arrived at a similar conclusion.

In floral anatomical characters also, *Balanites* resembles Zygophyllaceae[15,14,16,18].

According to Erdtman[6] the pollen grains of Balanitoideae resemble those of *Harrisonia* of Simaroubaceae.

The information on the cytology of Zygophyllaceae and Simaroubaceae is too scanty to draw any conclusion about the systematic position of *Balanites*. However in the basic chromosome number, X = 9. *Balanites aegyptiaca* resembles *Fagonia critica* of Zygophyllaeae and *Quassia amara* of Simaroubaceae (see Darlington and Wylie[3]).

Thus, taking the totality of evidences it is tentatively suggested that *Balanites* be retained in Zygophyllaceae but in a sub-family Balanitoideae. However, the similarities with Simaroubaceae do not rule out a probable common ancestral stock for both the taxa.

We record our sincere thanks to Dr. K. Subramanyam, Ex-Director, BSI, for critically going through the manuscript, to Prof. U. B. S. Swamy for facilities and Prof. Jafar Nizam for permission to collect the material of *Guaiacum officinale* from the Osmania University Botanical Garden. One of us (AP) is thankful to the Kakatiya University for the award of University Research Fellowship.

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LEAF BLIGHT OF TAPIOCA CAUSED BY *PERICONIA MANIHOTICOLA*

A SEVERE leaf blight of tapioca (*Manihot esculanta* Crantz.), caused by *Periconia manihoticola* (Vincens) Viégas, was observed in the later part of December 1976 in the experimental farm of the Assam Agricultural University, Jorhat. Symptom appeared as violet-blue spot (Violet-blue Group 93A & B of R.H.S. Colour Chart), upto 8 mm diameter. Centres of matured spots became buff to light brown with the margins remaining violet-blue—the violet discolouration spread into the green areas through veins to certain distance. Number of spots varied from a few to innumerable and in advanced stage the spots coalesced covering a large area resulting in defoliation.

Fruotifications developed from the infected tissues as hairy outgrowths. Conidiophores stout, brown, usually 3 septate (basal and uppermost septa vary close to base and tip, respectively), base bulbous, 236–373 × 23–33 μ; conidia olive brown to brown, round, verrucose, 23–41 μ in diameter Colony on PDA, effuse, light grey with white edge; mycelium hyaline changing to light brown, sparsely septate, may or may not be constricted at septa and points of origin, 3·3–5·8 (–8·3) μ broad (terminal branches may be 1·6 μ). Spores in filter-water germinated by producing 1 to 3 hyaline germ tubes, slightly thicker at base and constricted at the point of origin, and all the tubes originated side by side. Aboct 40% of the spores germinated after 20 hours at room temperature (10–20° C) when the tubes (branched twice or thrice) measured 342–880 × 5·9–10 μ.

Pathogenicity test was conducted with a spore-*cum*-mycelial suspension (from PDA) in the field. Inoculated portions were covered with moist cotton and then the whole leaf was covered with a polythene bag which was opened daily once to moisten the swabs. Symptom first developed after 4 days as violet-blue flecks which turned to typical spots after another day when the average temperature varied from 8·3 to 25·5° C.

All the 9 cultivars, *viz.*, H–97, H–2304 (5), H–3641 (2), H–1687 (1), H–4, H–312, Rani, H–43 and H–226, grown in the farm were found susceptible of which the first one was highly susceptible and the last two were less susceptible. Although this fungus has been recorded as a pathogen in South America Central America and Africa[1–3] on tapioca and rubber, this is the first report of its occurrence from the old world.

Our thanks are due to Mr. G. Medhi who referred the problem to us for investigation.

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SENESCENCE IN ISOLATED LEAVES OF *CESTRUM NOCTURNUM* LINN.

THE natural process of senescence of leaves has been greatly affected by exogenous treatment with some chemicals like auxins[7], cytokinins[9], gibberellins[1], purines[11], imidazoles[8,10], etc. The present investigation aims at studying the effects of some chemicals on isolated leaves of *Cestrum nocturnum* Linn. (Solanaceae). It is a plant with sweet aromatic flowers and is of importance in floriculture. Leaves were floated on aqueous solutions of different chemicals ranging from 1 to 100 ppm in petri dishes maintained in the dark. One set of leaves was floated on distilled water to serve as control. The salient results are presented in Table I.