

## Some new or interesting Rusts from Maharashtra-India.

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### 1. *Aecidium hemigraphidis* sp. nov.

Spermogonia epiphylla, subepidermalia, paraphysata, 110—130  $\mu$  diam. Aecia hypophylla, cupulata. 0.2—0.3 mm. diam. in maculis flavidis vel brunneis 2—5 mm. diam. disposita, cellulis peridii globosis vel ellipsoideis, 17—22  $\times$  27—42  $\mu$ , pariete interiore verrucoso, 2  $\mu$  cr., exteriore minute striato 3—4  $\mu$  cr., aeciosporae globosae vel ellipsoideae, 15—20  $\times$  21—26  $\mu$ , membrana 1.5  $\mu$  cr., moderate verrucosa.

On *Hemigraphis latebrosa* Nees (Acanthaceae), Chandore (Nasik), 20. VII. 1960. (Type) Leg. B. V. Patil.

*A. cumingii* Syd. described by Sydow et al (1931) on *H. rhytiphylla* (Nees) F. Vill. from Phillippines is distinct with its aeciospores 4—7 thickened apically. No other *Aecidium* is known on this host genus.

2. *A. crassocephali* Wakef. & Hansf. Proc. Linn. Soc. Lond. 161. p. 189, 1949.

*A. gynurae-cernuae* Depuis. On *Gynura angulosa* DC (Compositae). Nagpur (Maharashtra), 27. VII. 1963.

*A. gynurae* Petch (1912) described from Ceylon was in fact on *Emilia* sp. and Petch in 1919 changed it to *A. emiliae* Petch., a synonym of *A. formosanum* Syd. (1913).

*A. gynurae* Marchal. 1919, is homonym of *A. gynurae* Petch. *A. gynurae-cernuae* Depuis, 1955, is identical with *A. crassocephali* Wakef. & Hans. (1949). *A. mariani-raciborski* Siem. 1931, on *Gynura* sp. has slightly larger aeciospores.

Types of new species deposited in Herb. Crypt. Ind. orient. New Delhi, Herb. C. M. Kew, England, and National Fungus Collections, Beltsville, Maryland, USA.

*A. crassocephali* is recorded for the first time from India and *Gynura angulosa* DC forms a new host record.

3. *A. macowanianum* Thüm., Flora, Myc. Univ. No. 426, p. 380, 1963.

On *Conyza stricta* Willd. (Compositae) Nagpur, 20 VIII, 1963.

Spermogonia and aecia are scattered on leaf surface. Aeciospores measure 16—22  $\mu$  diam. and spore wall is uniformly 1.5  $\mu$  thick. A.

*hoffmannii* Syd. reported on *Conyza* spp. from Africa has apical thickening of spore upto 7  $\mu$ .

The rust is a new record for India.

4. *A. vernoniae-cinereae* Petch, Ann. R. Bot. Gard. Peradeniya, V. VI., P. II. p. 218, 1917.

*Vernonia cinerea* Less. (Compositae) Katol (Nagpur), 14. VII. 1964.

Petch (1912) described this *Aecidium* from Anuradhpur, Ceylon and Cummins (1941) record it from New Guinea. Aecia are scattered and aeciospores measure 8—12  $\times$  12—16  $\mu$ . This rust is a new record for India.

5. *A. rhytismoideum* Berk & Br., Fungi of Ceylon No. 855.

*A. rhytismoides* Rac. Sacc. VII. 807. — *A. melaenum* Syd.

On *Diospyros candolleana* Wt. (Ebenaceae) Amboli (Ratnagiri), 20. VI. 1962. *Maba nigrescens* Dalz. Amboli, 28. VI. 1962

Aeciospores germinate after 3—4 hours at 24°C, and germ tubes terminate in well developed appressorio.

*D. candolleana* and *M. nigrescens* are new host records for the rust. Formation of carbonaceous stroma is characteristic of this species.

6. *A. miliare* Berk. & Br., Fungi of Ceylon No. 851.

On *Diospyros melanoxylo*n Roxb. (Ebenaceae) Chanda, Maharashtra, 7. VIII. 1963.

Spermogonia and aecia are produced in regular infection spots. Aeciospores measure 22—27  $\times$  20—25  $\mu$ , wall, 1.5—2  $\mu$  thick. There is no blackening of the host tissue and is distinct from *A. rhytismoideum*.

7. *Crossoporsora zizyphi* (Syd. & Butl.) Syd. Ann. mycol. 16: 243, 1918.

*Cronartium zizyphi*. Syd. Butl. Ann. Mycol. 10: 268, 1912.

*Uredo zizyphi* Pat. Bull. Soc. mycol. Fr. 12: 135, 1896.

On leaves of *Zizyphus oenoplia* (Mill.) (Rhamnaceae). Chinchawad. Poona, 10. XII. 1958.

The genus *Crossoporsora* was established by Sydow (1918) based on *C. zizyphi* as the type. Arthur and Cummins (1936) reported the aecial stage for *C. sawadae* (Syd) Arth. & Cumm.

8. *Cerotelium fici* (Cast.) Arth. Bull. Torrey Bot. Club. 44: 509, 1917

*Uredo fici* Cast. Desmaz, Pl. Crypt. (Fasc. 34), 1662, 1848.

*Kuehneola fici* (Cast.) Butl.

On *Ficus carica* L. (Moraceae), Chandore (Nasik) 28. X. 1958.

Common in several localities in Maharashtra. — *F. glomerata* Roxb., Bhillwadi (Nasik), 14. IX. 1960. — *E. hispida* L. Nagpur, 20. XII. 1963. — *F. pumila* L. Kolhapur, 25. VI. 1962.

*F. pumila* is a new host record for this rust. Urediospores measure  $17-25 \times 13-18 \mu$ . Telia were found on *F. glomerata* and *F. pumila*.

9. *Chaconia butleri* (Syd.) Mains Bull. Torrey Bot. Club. 65: 628, 1938.

*Blastospora butleri* Syd. Ann. mycol. 10: 266, 1912.

On *Jasminum malabaricum* Wight. (Oleaceae) Trimbak. Sinhadag, Khandala. — *J. pubescens* Willd., Kolhapur, II, 1962.

The rust was originally collected on *J. malabaricum* Wt. from Matheran. Ramakrishnan et al (1950) reported it on *J. brevifolium* DC from South India. *J. pubescens* Willd. is a new host for this rust.

10. *Coleosporium clematidis* Barclay, Jour. Asiatic Soc. Bengal 59 (2); 89, 1890.

On *Clematis hedysarifolia* DC (Ranunculaceae). Kolhapur, 30. 1. 1962.

Cummins and Ling (1950) recorded *C. clematidis* on several species of *Clematis* from China. In India it is mostly found in Northern India.

11. *C. campanulae* (Pers.) Lev., Ann. Sci. Nat. III. 8: 373. 1847.

*Uredo campanulae* Pers. Sun. Fung. 217, 1801.

On *Wahlenbergia gracilis* Schr. (Campanulaceae). Khandala, 15. IV. 1959.

Uredia hypophyllous, orange-red, urediospores  $18-24 \times 20-28 \mu$ . Telia hypophyllous, teliospores cylindrical,  $18-24 \times 45-65 \mu$ , wall colourless. A new rust for Maharashtra.

12. *Dasturella grewiae* (Pat & Har.) Thirum., Bull. Torrey Bot. Club. 73: 348, 1946.

*Uredo grewiae* Pat & Har. Jour. de Bot. 14: 237, 1900.

On *Grewia salvifolia* Heyne (Tiliaceae) Mangi-Tungi (Nsik), 10. XII. 1961.

On *G. teliaefolia* Vahl. Nagpur, 15. II. 1965.

On *G. abutifolia* Vent. Nagpur, 25. II. 1963.

Thirumalachar (1946) on re-examination of the rust on *G. monticola* Sond. from South Africa assigned it to *Dasturella*. Payak (1953) recorded it on *G. asiatica* from Maharashtra. *G. salvifolia* and *G. abutifolia* are new host records.

14. *Hemileia woodii* Kalb. & Cke. Grevillea IX, pag. 22, 1881.

On *Vangueria spinosa* Roxb. (Rubiaceae), Mahori (Poona). 30. IX. 1959, Amboli (Ratnagiri), 2. I. 1963.

*H. woodii* has been known to occur on *V. intausta* and *V. latifolia* in South Africa and is reported on *V. spinosa* from Mysore, South India. From November to January, the rust is in abundance and most conspicuous in the field.

15. *H. wrightiae* Racib. Paras. Alg. und Pilz. Javas, I. p. 26—27, 1900.

On *Wrightia tinctoria* Br. (Apocynaceae). Ambe (Kolhapur), 30. I. 1963.

*H. wrightiae* first described from Java by Raciborski as *Hemileiopsis wrightiae*, has been found to occur in abundance near Kolhapur.

16. *Maravalia achroa* (Syd.) Arth. & Cumm. Philip. J. Sci. 61: 468, 1936.

*Uromyces achrous* Syd. Am. Mycol. 5: 491. 1907.

On *Dalbergia sissoo* Roxb. Papilionaceae Nagpur, 20. 11. 1963.

17. *M. millettiae* Yadav. & Thirum. Indian Phytopath. 8: 143, 1955.

On *Milletia racemosa* Benth (Papilionaceae), Nagpur. 10. 1. 1963.

18. *Melampsora euphorbiae* Cast. Obs. Pl. Acothy. 2, 18. 1843.

*M. helioscopiae* Wint. Rabh. Krypt. Fl. Ed. z. 1 (1), 240, 1882.

On *Euphorbia dracunculoides* Lamk. (Euphorbiaceae), Ghungashi (Akola), 20. 1. 1960, Sakoli, 4. 12. 1963. — *E. geniculate* Ortag. 4. 11. 1962. Kolnapur, 15. V. 1958, Poona, 12. X. 1963, Nagpur, *E. rothiana* Spreng. 28. 1. 1959. Mahabaleshwar.

*M. euphorbiae* is regarded as a collective species made up of a number of races or special forms which, in part, show slight morphological differences. Urediospores 14—22 × 12—20 μ, Paraphyses capitate, hyaline 16—22 μ diam. Telia mostly on stem, teliospores 32—55 × 8.14 μ, wall thickness 1.5—3 μ.

19. *Phakopsora artemisiae* Hiratsuku, Japanese Jour. Bot. 3: 298. 1927.

*P. circumvallata* Sawada Descr. Cat. Formosan Fungi 5: 49, 1931.

On *Artemisia nilagirica* (Clarke) Pamp. (Compositae), Kolhapur, 25. X. 1963.

Formerly the rust is recorded from Molta (U. P.) in India collected by Bagchee (Mundkur, 1943).

20. *Phakopsora formosana* Syd., Ann. Mycol. 12: 1914.

*Schroeteriaster glochidii* Syd.

*Bubakia glochidii* (Syd.) Diet. Die natürlichen Pflanzenfamilien, Bd. 6: 48, 1928.

*B. indica* Ramak et al., Proc. Indian Acad. Sci. Sec. B. 32, 75, 1950.

On *Glochidion velutinum* Wight. (Euphorbiaceae), Chikhaldia (Amraoti), 21. XII. 1959.

Teliospores in non-crumptent crusts, measuring  $15-20 \times 17-30 \mu$ . Wall upto  $4 \mu$  apically thick. The rust is reported from Formosa, Philippines, Japan (Hiratsuku, 1941) and New Guinea (Cummins, 1941).

21. *Phakopsora meibomiaae* Art.

*Physopella meibomiaae* Arth., Mycologia 9: 59, 1917. — Sacc. 23, 843, 1925.

*Phakopsora mangaloriae* Ramk. & Sundar, Prov. Indian Acad. Sci., Sect. B. 35, 118, 1952.

On *Teramnus labialis* Spr. (Papilionaceae). Amboli (Ratnagiri), 24. I. 1962.

*Desmodium gangeticum* DC. (Papilionaceae) Sakoli (Bhandara), 22. XII. 1963.

The rust is reported on *Desmodium supinum* DC (= *Meibomia supina* (Sw.) Britton (Arthur, 1917) and *D. incanum* DC (Roure, 1963) from Puerto Rico. *Phakopsora mangaloriae* described on *D. triquetrum* DC. (Ramakrishnan, 1952) from South India is synonymous with *P. meibomiaae*. Cummins (1950) recorded it on *D. racemosum* (Thun.) DC from China. This rust is a new record for Maharashtra and *Teramnus labialis* and *D. gangeticum* from new host records.

22. *Physopella oplismeni* sp. nov.

Uredii hypophyllis, sparsis, erumpentibus, flavobrunneis, 0.1—0.2 mm diam., periphysibus incurvatis vel areis, urediosporis ellipsoideis, vel obovoideis  $17-21 \times 24-30 \mu$ , membrana  $1-1.5 \mu$  crasa, aureo-brunnea echinulata, poris germinationis 3—4 sparsis, obscuris. Teliis hypophyllis, subepidermalibus, indehiscentibus, atro-brunneis. Teliosporis catenulatis compositis, plerumque oblongis  $14-17 \times 22-28 \mu$ , membrana  $1.5-2 \mu$  crassa, hyalina.

On *Oplismenus compositus* (L.) Beauv. (Gramineae). — Amboli (Ratnagiri) 20. X. 1963, Leg. B. V. Patil (type). —

*P. africana* Cumm. on *Brachiaria brizantha* (Hochst) Stapf. and *P. compressa* (Wains) Cumm. on *Paspalum* sp. differ in arrangement of germ pores, spore measurements and spore colour. *Phakopsora oplismeni* Cumm. has irregularly arranged smaller teliospores.

23. *Puccinia arudinellae* Barcl., J. Asiatic Soc. Bengal 56: 245, 1889.

On *Arundinella nepalensis* Trin. (Graminae), Devlappar (Nagpur), 30. IX. 1963.

The rust is a new record for Maharashtra.

24. *Puccinia blepharidis* P. Henn. Bot. Ergeb. der Kune-Sambesi-Expedit, 1902, p. 2 (Sydow, Monogr. Ured. I, 231).

On *Blepharis boerhaaviaefolia* Pers. (Acanthaceae), Sakoli (Bhandara), 20. VIII. 1965.

25. *Puccinia bupleuri* Rud. Linnaea 4: 514, 1829.

On *Bupleurum mucronatum* W. & A. (Umbelliferae), Devlappar (Nagpur), 30. VII. 1963.

A new record for Maharashtra.

26. *Puccinia cahuensis* Ell. & Ever, Bull. Torrey Bot. Club. 22: 435, 1895.

*P. digitariae* P. Evans Ann. Bolus Herb. 2: 111, 1917.

On *Digitaria marginata* Link. (Graminae), Poona, 6. I. 1969.

The urediospores possess 3—4 scattered germ pores. Thirumalachar (1947) previously recorded this rust from Bangalore, South India.

27. *Puccinia pachypes* Syd. apud Sydow & Butler, Ann. Mycol. 10: 262, 1912.

On *Spodiopogon rhizophorus* (Steud.) Pilg. (Graminae), Saptashrungi (Nasik), 24. XI. 1961.

Previously the rust is reported from South India and it is a new record for Maharashtra.

28. *Puccinia wattiana* Barclay, J. Asiatic Soc. Bengal 58: 109, 1890.

On *Clematis triloba* Heyne (Ranunculaceae), Trimbak (Nasik), 29. I. 1961.

Aeciospores measure  $18-24 \times 16-19 \mu$ , urediospores  $22-27 \times 16-22 \mu$  and teliospores  $18-26 \times 35-47 \mu$ . The rust is so far recorded from North India and is a new addition to rusts of Maharashtra.

29. *Ravenelia acaciae-intsiae* sp. nov.

Spermogoniis et aeciis ignotis. Urediis epiphyllis, subcuticularibus, dispersis, aureo-brunneis, paraphysatis, urediosporis ellipsoidis,  $10-14 \times 18-25 \mu$ . membrana  $1-1,5 \mu$  crassa, verrucosa, poris germinationis 2 equatori alibus. Teliis amphigenis, subcuticularibus, atrobrunneis, capitulis teliosporarum discoideis vel convexis, castaneo-brun-

neis, 50—76  $\mu$  diam. ex sporis 4—6 in compositis, teliosporae unicellulares, 15—20  $\times$  20—28  $\mu$ . membrana apicali 4—7  $\mu$  crassa, cystidiis eodem numero ut cellulae marginales a: pedicello hyalino, deciduo.

On *Acacia intsia* Willd. (Mimosaceae), Trimbak (Nasik) 29. 1. 1961  
Leg. B. V. Patil. (Type)

The species differs from other spp. described on *Acacia* so far in spore measurements.

30. *Ravenelia mitteri* Syd., Ann. Mycol. 33: 53, 1935.

On *Indigofera pulchella*. Roxb. (Papilionaceae). Bhlwadi (Nasik), 27. XI. 1960.

31. *Ravenelia kirganelliae* (Mundk. & Thirum., C. M. I. Mycol. Pap. No. 16: 22, 1946.

On *Kirganelia reticulata* Baill. (Euphorbiaceae). Umred (Nagpur), 11. XI. 1962.

32. *Ravenelia spicigerae* sp. nov.

Spermogoniis et aeciis ignotis. Urediiis amphigenis, 0.5—1 mm. diam., cinnamomeo-brunneis, subcuticularibus; uredosporis ellipsoideis 9—13  $\times$  15—21  $\mu$ , membrana 1—1.5  $\mu$  crassa, flavida vel hyalina, echinulata, poris germinationis 3—4, equatori alibus; Teliis amphigenis, 0.5—2 mm diam. atro-brunneis, subcuticularibus, capitulis teliosporarum discoideis vel convexis, obscure castaneo-brunneis, tuberculatis, 70—105  $\mu$  diam. e sporis 6—9 compositis, spois singulis unicellularibus, 12—17  $\times$  24—35  $\mu$ , membrans castaneo-brunnea, 2—3  $\mu$  crassa, ad apicem 6—10  $\mu$  crassa, cystidiis eodem numero ut cellulae marginales, capitulis adpressis, in aqua intumescentibus et ruptis, pedicello hyalino, deciduo.

On *Prosopis spicigera* L. (Mimosaceae), Chandore (Nasik), 14. XI. 1961. Leg. B. V. Patil (Type)

Urediospore wall is 3—5  $\mu$  thicker above, *R. arizonica* Ell. & Ev. (1896) (= *R. prosopidis* Long, 1917) described on *Prosopis juliflora* Pent. from America. *R. decidua* (Peck.) Holw. and *R. holwayi*. Diet. have subepidermal uredia and telia. *R. prosidiiicola* Lindq. on *P. alpataco* and *R. chacoensis* Lindq. on *P. nigra* from Argentina differ in spore measurements.

33. *Scopella echinulata* (Niessl.) Mains, Ann. Mycol. 37: 58, 1939.

*Uromyces echinulatus* Niessl. ex. Rabenhorst Hedwigis 20: 149, 1881.

On *Madhuca indica* Gmel. (Sapotaceae), Nagpur, 10. 1. 1964.

34. *S. gentilis* (Sud.) Mund & Thirum. Bull., Torrey Bot. Club 77: 206, 1950.

*Uromyces gentilis* Syd., Ann. Mycol. 31 : 84, 1933.

On *Mimusops hexandra* Roxb. (Sapotaceae), Nagpur. 15. VII. 1963.

35. *Trochodinium sampathense* Thirum., J. Indian Bot. Soc. 21: 66, 1942.

On *Argyrea cymosa* Sweet. (Convolvulaceae), Pimpri, (Poona). 5. XI. 1961. *Lettsomia elliptica* Wight., Mulsi, 29. IX. 1959. Khandala, 26. XII. 1961. Amboli, 27. I. 1962.

36. *Uromyces blainvilleae* Berk., Ceylon Fungi No. 826.

On *Blainvillea acmella* (L.) Phil. (Compositae), Chandore (Nasik), 14. IX. 1961.

Urediospores  $20-26 \times 30-32 \mu$ , wall  $4 \mu$  thick, somewhat papillate, epispore verrucose.

37. *Uromyces gemmatus* Berk. & Curt., Journ. Linn. Soc. X. p. 357, 1869.

On *Jacquemontia paniculata* (Burm. f.) Hall, (Convolvulaceae), Nagpur, 18. X. 1964.

Sydow und Petrak (1931) recorded this rust on the same host from Philippine. In India it is reported for the first time.

38. *Uromyces pseudorthriae* Cke. Grevillea 10: 127, 1882.

On *Pseudarthria viscida* W. & A. (Papilionaceae), Nagpur, 13. XII. 1964.

Uredia hypophyllus, cinnamon-brown, pulverulent; urediospores globose to ellipsoid,  $19-25 \times 16-22 \mu$ , echinulate, Teliospores  $20-34 \times 17-20 \mu$ , wall  $3-3.5 \mu$  thick at sides and upto  $7 \mu$  at apex.

The rust is earlier reported from South Africa and Philippines. It is a new addition to Indian rusts.



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Artikel/Article: [Some new or interesting Rusts from Maharashtra - India. 149-156](#)