

Some new or interesting Rusts from Maharashtra-India.

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1. *Aecidium hemigraphidis* sp. nov.

Spermogonia epiphylla, subepidermalia, paraphysata, 110—130 μ 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 μ , pariete interiore verrucoso, 2 μ cr., exteriore minute striato 3—4 μ cr., aeciosporae globosae vel ellipsoideae, 15—20 \times 21—26 μ , membrana 1.5 μ 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 Phillipines 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 μ diam. and spore wall is uniformly 1.5 μ thick. A.

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

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 μ . 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 μ , wall, 1.5—2 μ 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-crumpent crusts, measuring $15-20 \times 17-30 \mu$. Wall upto 4μ 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* (Thunb.) 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 μ 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 μ 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 cahuensisi* 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 μ diam. ex sporis 4—6 in compositis, teliosporae unicellulares, 15—20 \times 20—28 μ . membrana apicali 4—7 μ 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 spicigeræ* sp. nov.

Spermogoniis et aeciis ignotis. Urediiis amphigenis, 0.5—1 mm. diam., cinnamomeo-brunneis, subcuticularibus; uredosporis ellipsoideis 9—13 \times 15—21 μ , membrana 1—1.5 μ 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 μ diam. e sporis 6—9 compositis, spois singulis unicellularibus, 12—17 \times 24—35 μ , membrans castaneo-brunnea, 2—3 μ crassa, ad apicem 6—10 μ crassa, cystidiis eodem numero ut cellulae marginales, capitulis adpressis, in aqua intumescens 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 μ 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. prosidicola* 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 4μ 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 7μ at apex.

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

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