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## ***Corallorhiza* and its Historical Background** **Part II: The Early Scientists**

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After the explanations about *Corallorhiza* and its nomenclatorial history in last quarter's Native Orchid Conference Journal, I now present the background of three scientists who were influential in the early history of *Corallorhiza*: Haller, Gagnebin, and Chatelain.

We will start with **Albrecht von Haller** (Figure 1), who not only left a large number of publications about medicine and botany, but also his correspon-



Figure 1. Albrecht von Haller (Jugendbildnis aus Dorfler. Botaniker Portraits.)

dence survived in large parts. Consequently, we have a very good picture of this famous scientist. Albrecht von Haller was born in Bern, Switzerland, on 16 October 1708. It is said that young Haller was frail but precocious; until the age of nine years he was suffering from rickets. Haller was first educated by a private teacher, then after the death of his father in 1721, he attended for one and a half years the public gymnasium in Bern. After he had finished the gymnasium he was sent to the physician Johann Rudolf Neuhaus in Biel for further education. Originally the family had planned a clerical career for Albrecht, but his interest in medicine grew and so in 1723 he went to the University of Tuebingen in Germany to study medicine. A short time later he traveled to Leiden, Netherlands, to conclude his study. One year later he met the famous scientist Conrad Gesner (after whom the plant family *Gesneriaceae* is named) in Leiden. Gesner also was of Swiss origin (Zurich) and they became friends. In the summer of 1726 Haller traveled for six weeks through northern Germany and in May 1727 he got his Doctor of Medicine degree from the Leiden University. During the same year he traveled to England where he was introduced to the president of the Royal Society, Hans Sloane. And after London, he visited Paris where he took a course in surgery with the famous F. Le Dran. The extremely unsatisfactory results of surgery in this time was the reason that Haller, in his own words, 'never applied practical surgery to human beings.'

He left Paris in February 1728 and went to Basel, Switzerland, where he studied mathematics with the famous Bernoulli, and he started to build up friendships with other scientists also. He practiced medicine and also worked as a teacher at the university for Johann Mieg. Mieg was a great admirer of Haller and became later a selfless promoter and assistant of Haller. During his time in Basel, Haller started collecting plants intensively, he traveled often in the surroundings of Basel, and together with Conrad Gesner he also undertook a long journey through the Alps. In those years in Basel, Haller laid the foundation for all his later botanical publications. He left Basel in 1729 and went back to Bern where he opened his own medical practice.

Through his studies he had contact with many scientists in Europe, but his hometown refused to recognize him. His hope for a political or scientific position in Bern was futile. Even a vacant professorship for history was given to another candidate and so, in 1736 when the curator and initiator of the University of Goettingen, Germany, offered Haller a position as professor of botany, anatomy, and surgery, he accepted it without any hesitation. Haller's idea of a faculty for medicine was based on his own experience from his time in Leiden, and he worked very hard for a realization of those ideas. In 1743 he started publishing *Icones Anatomicae*, a magnificent illustrated book about anatomy. As a scientist Haller combined bright skill for experiments, ability for patient observation, and outstanding knowledge of literature with clear argumentation. He refused to accept explanations of natural facts based on philosophical approaches and always asked for explanations based on experimentation. For

him the experiment was the basis, and any hypothesis had to be proved by experiments. As a physician, natural scientist, and poet, Haller was without any doubt one of the greatest scientists in Europe during the age of enlightenment.

During his years in Goettingen, Haller founded also the botanical garden of the university. The garden developed fast as catalogues from the years 1743 and 1753 prove. Haller also wrote the first comprehensive flora of Switzerland. *Stirpium Helvetiae Indigenarum* was published in Goettingen in 1742 and gained broad acceptance in the botanical community. Its review by Carl von Linne was very positive despite Haller's disagreement on some points with Linne's ideas about nomenclature and classification of plants. In Haller's post-doctoral thesis *De Methodica Studio Botanices Absque Praeceptore* (1736), he had favored a natural system based on morphological features, especially of the flowers. This system reflected the natural relationship, but because he used the old polynomial nomenclature (Figures 2, 3, and 4), his system was later surpassed by Linne's system. Linne used a very clear and simple binomial nomenclature, which was almost exclusively based on anatomy and morphology of the sexual organs of flowers.

In Goettingen, Haller earned international recognition. In his native Switzerland he became the first foreign member of the Swedish Academy of Science, but in Goettingen he finally made the breakthrough. He was inundated with honors and titles, and turned down offers from the Universities of Oxford and Utrecht. Friedrich the Great tried to get him to become a member of the Prussian Academy of Sciences to Berlin, but Haller stayed at Goettingen. He was decisively involved in the founding of the Scientific Society of Goettingen, for which he prepared the bylaws and proposed its members. For all his life he remained president of this internationally-known society. The journal *Göttingischen Gelehrten Anzeigen* was published from 1745 under Haller's editorship and from 1747 to 1753 under his direction. Haller transformed this formerly rather insignificant journal into an internationally reputed publication.

Haller returned to his native Bern in 1753. Some of the reasons for this included his deteriorating health, overload with work, home-sickness, and his wish to ensure the education of his children in Switzerland. In his first years in Goettingen he had lost his first wife and two children. In 1741 he married for the third time, but it was not free of tension. He also faced other problems in Goettingen, and the friendly connection with Carl von Linne became cooler, especially after Linne published his *Species Plantarum* in 1753. With this publication by Linne, taxonomy started at point zero and Haller naturally saw the impact of the fact that all names published before the publication of Linne's *Species Plantarum* became invalid.

In 1745 Haller had been elected a member of the grand chamber of Bern – his international reputation obligated the authorities of Bern — and in 1753 he got

dum cavum, pariete superne contracto, ut ostium apertum cymbæ aliquanto minus sit. Totum lineis depressis percurritur, inter quas colliculi eminent (GMELIN. & nobis l. c.). In noltris flavum est, intus maculis & lineis pilosis pingitur.

Scapus (GMELIN. f. 1. 2. nobis f. 3. 4. & 1. 2.) solidus fert petalum peculiare 1), antheras duas (GMELIN. ad. r. utrumque. nobis f. 3. 4. I. K.) & aliquid, quod pro tuba haberi possit (TOURNEFORT. G. nobis f. 3. 4. L.). Petalum peculiare fungoli capituli Helleborines locum tenet, petiolatum, versus tubam cavum, ovatum (GMELIN. in variet. γ. ad 1. inferius nobis f. 3.), orifice plicatis, proboscidi tubæ imminens. Color ei albus, lineis pictis purpureis. Eodem ex petiolo tuba in proboscidem (GMELIN. in f. 1. 2. utroque nobis f. 3. L. L.), solidam & carnosam, dilatatur, medio dorso sursum eminente, deorsum concava, tribus quatuorve lineis exarata. Ad latera tubæ duo (GMELIN. I. utrumque. nobis f. 3. 4. N. N.) ungues solidi, divergentes, curvuli, triangulares (CLUSIUS cornubus cancrorum comparat.): sub eorum singulum anthera (f. 3. 4. i. k.) sessilis, transversim lata, deorsum bilocularis, septo divisa.

Hæc tota columna flaminea ostio cymbæ iminet, & in immatura comprehenditur. Calceoli varietates aut adfines plantæ sunt.

I. *Helleborine, calceolus dicta Mariana, foliis binis, ex radice ex adverso erumpentibus, flore atropurpureo* PLUKNET. *Amaltb.* p. 115. *Mantiss.* p. 101. t. 418. f. 1. & Ejus *Helleborine Calceolus dicta Mariana, caule folioso, flore luteo minori.* *Mantiss.* p. 101. t. 418. f. 2.

*Calceolus marianus glaber, petalis angustis* CATESBY *natur. hist.* II. p. 73.

& EJUSDEM CATESB. *Calceolus flore maximo rubente, foliis amplis, bisulcatis crenatis, radice dentis canini.* *append. t. 3.*

II. *Floris duplo majori* HERMAN J. R. H. & C. HALE. *Eden.* p. 305.

*Calceolus petalis nectario brevioribus* GMELIN. p. 3. t. 1.

III. *Petalis omnibus lanceolatis, auctore* GMELINO.

Talis in Sibiria provenit *Calceolus purpureus, speciosus* AMMAN. *plant. rutenb.* p. 176. t. 21. GMELIN. *rar.* γ. p. 2. T. I.

& *Calceolus minor, flore vario.* AMMAN. p. 177. t. 22.

*Calceolus foliis ovatis, binis, caulibus* GMELIN. p. 5. n. 5.

& in America *Calceolus Marianus Canadensis* CORNUT. *plant. Canad.* c. 78. p. 205.

Conjungit certe LINNÆUS, & ipse GMELINUS: notas discriminis gnari inquirent.

Tab. XLVIII.

OPHRYS CORALLORRHIZA LINN.

CORALLORRHIZA RUPP. I. p. 281. *Corallorrhiza neottia* Scop.

GMELIN. *Flor. Sibir.* p. 26.

OPHRYS *Species* LINN.

Valde adfines Epipactidi, antheris quaternis differt.

CORALLORRHIZA RUPP. *Orchid. gen. constit.* p. 21. HALL. N. 1301. *Hist. Stirp.* tab. XLIV. GMELIN. l. c.

*Orobanchæ Succorum, radice Coralloide, flore albo* RUDBEK. *Elys.* II. p. 234. f. 16. *Ophrys bulbis ramosis, flexuosis, caule vaginato, (aphyllo) nectarii labio trifido* LINN. *Spec.* p. 1339. (*Corallorrhiza neottia*, SCOPF. edit. 2. n. 1184. *Neottia*, *Linm. Flor. lapp.* edit. *Smith.* p. 255. VILLARS II. 45.)

Passim in fylvis abiegnis umbrosis. *Sur la Montagne Darnain, à la Combe de Pelu, à la Jaques, à Sombaille, au haut du bas Monsieur, pres de la Chaud de fonds* Cl.

GAG-

1) TOURNEFORT. F. G. GMELIN. f. 1. inferius nobis. 1. 2. 3. 4. II.

Figure 2. Page 54 from *Icones Plantarum Helvetiae*, 2<sup>nd</sup> edition (1813) by Albrecht von Haller.

the subordinate appointment as chief caretaker of the townhall. Haller was involved in the reorganization of the Academy of Lausanne in 1757; in 1758

Tab. XLIII.

55

GAONEBIN. Circa la Brevine CHATELAIN. In Aquilejenfibus passim, en Combainaz, Chapuisé, Javernaz.

Radix ex scapo ad angulum rectum declinat, sed undique adpendices edit, quæ ipse ramose sunt, obtusæ, ut in Corallis; teneræ omnes, fucci plenæ, albæ; Scapus dodrantalis, pedalis, rectus, aphyllus, præter squamas non virides, parum extantes, obtusas. Spica rarior, florum fere circa duodenos. Stipulae ovato lanceolatae. Petioli aliquot linearum, hinc fructus penduli.

Germen ovato triquetrum, extus convexius, tribus colliculis, & tribus eminentibus lineis distinctum, illi valvae sunt, quibus ex classico more semina scobiformia adfiguntur. Petala sex, tria in galeae (Tab. nostr. f. 1. 2. 3.) speciem facta, nempe supremum (a.), & duo interiora (b. c.); exteriora tria ovato lanceolata (a. b. c. f. 4. 3\*. 4\*.), secundum & tertium patula descendunt. Exteriora viridia sunt, quartum & quintum latiora, ovata (f. 3. 4. d. e.), acuminata, alba; viridi linea distincta; sextum, seu labellum, ex ovato lanceolatum (f. f.), acuminatum, duabus lineis eminentibus percursum (h. h.), aut figura etiam lanceolata inscriptum; alias purum, album, in faucibus tamen purpureis maculis infigne, in principio duos auctos & breves denticulos exigit (g. g.). Denticuli labelli alias obscuri sunt (GMELIN. nulli.), neque tamen ideo speciem separaverim (CHATELAIN).

Columna staminea (f. 6. 8. 9. 10.) superne convexa, inferne cavula, purpura maculata. In ejus parte suprema duo sunt margines, superior (q. q.) in arcum flexus; inferior, seu sustentaculum, mucrone brevi tripartito (l. l.) eminens. Inter eos margines virides est vallecule (m. m.). Ex superiori margine exit fungulus celerime (k. k.) siccescens, inclinatus. Sub eo sunt duæ ovals capsulæ (n. n.), dorsis oppositis, tenerimæ, spongiosæ. Iis apertis adparent quatuor 1) antheræ, seu globuli ovati, pellucidi, in quoque loculo bini. Pro iis loculis duæ in labello depressiones inscribuntur. Maturi elabuntur, & glutinoso scapo passim adherent, cavosque nidus relinquunt (f. 7. o. o. p. p.).

Cæterum figuras 6. ad. 10. ipse delineavi, sola summa rerum momenta fecutus, quæ oculo vitro convexo adjuto se offerebant.

Tab. XLIII.

RHAMNUS ALPINUS. LINN.

RHAMNUS inermis, foliis ovatis, crenulatis. HALL. 823. Com. Soc. R. Gott. II. t. 16.

*Alnus nigra baccifera rugosiore folio sive major* I. B. I. p. 562.

*Frangula altera polycarpus* C. B. prodr. p. 160.

*Rhamnus (alpinus) inermis, floribus dioicis, foliis duplicato crenatis* LINN. I. p. 289:

(VILLARS II. 537.)

(*Rhamnus inermis, floribus dioicis; foliis ovali lanceolatis glanduloso-crenulatis.*

WULFEN in Jacq. Collect. III. 15.)

In Helvetia subalpina & montana minime rarus. Versus Eremitæ Agnensis Cellam in duimetis, & passim circa les Plans, & in Valesia. In Jura frequens, supra Dornach; infra Vallorbe; circa Ferrière, &c. In Wasserfull; Granvi &c.

Neglectus nuperis frutex, decempedalis, frondosus. Lignum durum, flavescens: liber aurantius. Folia glaberrima, ora subtiliter crenata; ex ovatis lanceolata. Flores in perbrevis, unifloris, pedunculis conferti; in aliis arboribus mares foli, femine in aliis. Calyx feminino flori campaniformis, quatuor segmentis triangularibus, viridibus. Petala minima, quatuor, subulata. Tuba triâda & quadrifida. Baccæ nigra, bicollis, tricollis, quadricollis, majuscula. Semina ad quatuor, trihedra, unâ a facie convexa, duabus planis. Martium plantarum calyx apertus, clausus, pariter quadrifidus, segmentis triangulis; petala minima, rubra

\*) f. 8. 9. Vidit etiam Clar. GAONEBIN, & CHATELIAN.

Figure 3. Page 55 from *Icones Plantarum Helvetiae*, 2<sup>nd</sup> edition (1813) by Albrecht von Haller.

he became director of the salt mines at Roche, and in 1762 deputy of the governor of Bern in Aigle. In order to fulfill his duties in Aigle in the French speak-

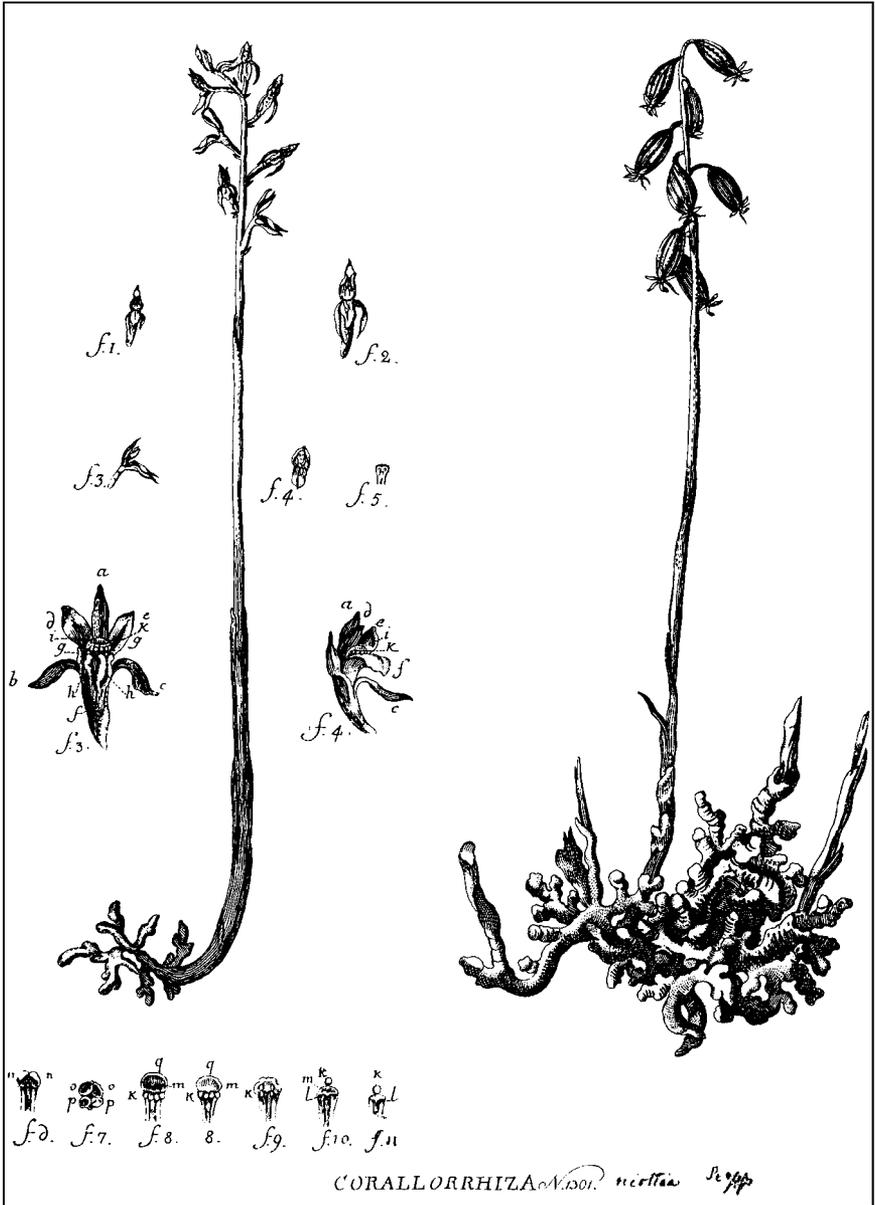


Figure 4. From *Icones Plantarum Helveticae*, 2<sup>nd</sup> edition (1813) by Albrecht von Haller.

ing part of the state of Bern, Haller had to leave Bern. He came back to Bern on 27 October 1764; in 1766 he became appointed member of the court of mar-

riage and the court of appeal in Bern. He never really liked administrative tasks but it allowed enough free time to follow his scientific interests, and Haller very much appreciated this advantage. Besides the large number of publications in the area of medicine he turned back to his old project of a flora of Switzerland. *Historia Stirpium Indigenarum Helvetiae Inchoata* was published in 1768 in three volumes and was one of the most outstanding publications in this area and time. Haller was occupied, naturally, with taxonomy and systematics, but his main interest was in the physiology of plants. It was Haller who made this discipline its own science. In his last years, under the pressure of increasing health problems, Haller spent a lot of his time with the collection of literature for bibliographies in different areas of science. He never again left Switzerland and refused to accept invites from the Universities in Halle, Germany, and St. Petersburg, Russia. In spite of his health problems he continued his correspondence with the leading scientists of his time. He left about 13,000 letters from about 1,100 different contacts when he died on 12 December 1777 in Bern.

Haller mentioned the genus *Corallorhiza* several times, and was the first after Rupp to use the generic name *Corallorhiza* in *Enumeratio Methodica Stirpium Helvetiae Indigenarum* (1742). Unfortunately we don't know why he used in his second edition of Rupp's *Flora Jenensis* (1746) the generic name *Rhizocorallon* instead of *Corallorhiza*. After *Species Plantarum* (Linne, 1753) the name *Rhizocorallon* was used again by Gagnebin without mentioning Haller as author. In 1795 Haller accepted Linne's *Ophrys corallorhiza* and used in his *Icones Plantarum Helvetiae* Rupp's *Corallorhiza* as synonym. This book with its beautiful and very detailed illustrations was published in 1795 after Haller's death. In his correspondences with colleagues in Basel, Haller mentioned *Corallorhiza* several times, and he wrote to Mieg on 24<sup>th</sup> June 1757 that *Corallorhiza* would have to be treated as its own genus. On 18<sup>th</sup> May 1759 Haller confirmed receiving dried specimens of *Corallorhiza*, collected by Chatelain in the Swiss Jura, and on 18<sup>th</sup> October 1762 he wrote Mieg that he had learned about new *Corallorhiza* locations in Switzerland.

Unfortunately we do not have the same accurate information about the second scientist involved, **Abraham Gagnebin de La Ferrière**. He was born on 29<sup>th</sup> August 1707 in the community of La Ferrière in the French speaking part of the Swiss Jura as first son of a medic. Together with his younger brother, Abraham was educated at home by a private teacher. In 1721 he went to Basel where he started to study medicine to later help his father. In Basel he developed an interest in botany and started collecting plants on excursions around Basel. In 1725 Gagnebin went home to La Ferrière and took over a part of his father's medical practice. The many home visits in the remote areas of the Swiss Jura gave him the opportunity to travel through hills and valleys and to collect plants. The family Gagnebin was for the local situation wealthy, but the father was not able to finance more studies or travels of his son Abraham.



*Corallorhiza striata* var. *striata*.

Photos: David McAdoo

The only possibility for Abraham to travel at least sometimes was the military service, so Gagnebin joined as surgeon a Swiss regiment in Strasbourg. He had the luck to meet in Strasbourg the botanist Lindern and his service left him enough time to join Lindern on extended excursions. Between 1730 and 1735 he changed garrisons several times and hence traveled through a large part of France. On all his travels Gagnebin wrote a detailed diary with notes and sketches, and besides this, he

built up a large herbarium. He started also to collect minerals and fossils, and the result was another large collection. In 1735 he left the military service and settled as medic in his home village La Ferrière, where he married the same year. His bother Daniel also left the army and came home. Daniel had also studied medicine and became a great help for Abraham by taking over his responsibilities from time to time, giving Abraham the possibility to travel and to follow his interests in natural history. Interestingly, some of these travels through the Alps, the Piedmont, and the Wallis were sponsored by Albrecht von Haller. Haller would have financed even more of Gagnebin's travels if he only had been able to afford it. The first meeting of Gagnebin with Haller took place in 1739 when Haller was traveling with Friedrich Salomon Scholl, town-medic of Biel. Scholl and Haller visited medic and botanist D'Ivernois in his

house in Neuenburg and met Gagnebin there. The four went on a trip to Creux de Vent and a long lasting friendship between Haller and Gagnebin began.

Gagnebin himself published only very few articles. His importance was not in the written word but in his cooperation with Haller and other botanists; he selflessly and unconditionally helped with all his own knowledge and material. Haller wrote that his plant history of Switzerland (*Enumeratio Methodica Stirpium Helvetiae Indigenarum*) was mainly based on material and notes by J. Gesner and A. Gagnebin. Like Haller, Gagnebin had an intensive correspondence; this was not only with Haller (about 100 letters are known) but also – to mention a few – with J. Gesner in Zurich, with Allioni in Turin, with Bernard de Jussieu in Paris, and with Jean Jacques Rousseau. The contact with Rousseau was close, and he spent from time to time a few days as Gagnebin's pupil in his house in La Ferrière. In his later years Gagnebin always showed visitors the small room in which Rousseau lived during those visits.

After Gagnebin's death on 23 April 1800, his large, comprehensive and excellently organized and maintained collections of minerals, plants, and fossils unfortunately were split up and only a small part of the fossil collection ended in the possession of the university in Basel, Switzerland. Gagnebin's name wrongfully was forgotten, but in 1855 the assembly of the Swiss Society of Natural History ended with the toast 'A la mémoire d'Abraham Gagnebin de la Ferrière! Qu'elle vive!'

Gagnebin had published a few papers. In 1755, two years after Linne's *Species Plantarum* and in connection with *Corallorhiza* he published 'Observations faites sur le systeme des auteurs de Botanique et sur l'Ophris minima C.B.' in *Acta Helvetica Physico-Mathematico-Anatomico-Botanico-Medica*. In this article Gagnebin dealt with the classification systems by different authors like Tournefort. He mentioned for the first time after *Species Plantarum* (Linne, 1753) the generic name *Corallorrhiza* (with two 'r's), immediately followed by *Rhizocorallon* as a second generic name. *Rhizocorallon* was used by Haller in 1745, and *Corallorhiza* (with one 'r') was used by Rupp in 1718. Because both generic names had been used before 1753, the 'honor' of the first use of both generic names after *Species Plantarum* stayed with Gagnebin.

The third scientist who played an important role in connection with *Corallorhiza* is **Jean Jacques Chatelain**, who is also the least known. Chatelain was born in 1736 in La Neuveville, Switzerland, but almost nothing is known about his family. A portrait of him also is lacking. In the files at the University of Basel we find a remark that Chatelain in December 1753 started study at the faculty of natural sciences and medicine. In 1756, three years later, he reached his Candidate of Medicine, and in 1758 he left Basel to conclude his studies in Montpellier, France. In Basel Chatelain became a friend of the bota-

nist Lachenal. Chatelain first met with Albrecht von Haller - Haller was then director of the salt mines of Berne at Roche – in 1759. Initiated by his friend Lachenal, Chatelain wrote to Haller; in his first letter he mentioned his collections of *Corallorhiza* from near La Brevine in the Jura. Haller answered Chatelain immediately and asked him to study unopened buds of the plant and to send him dried specimens. Haller added painstaking, exact instructions on how and when to send the specimens to Bern. We don't have the complete correspondence between Chatelain and Haller, but we see very clearly the admiring, obliging tenor of Chatelain against the 'grand' Haller in these letters, and the frequently impatient, almost commanding answers by Haller. In Haller's letters we read that he obviously had received drawings or sketches of *Corallorhiza* by Gagnebin without detailed information about the sexual organs. Based on this material and Chatelain's observations, Haller was able to add the missing parts himself. Later he wrote to Chatelain that he was happy to see his own observations confirmed. In exchange for the *Corallorhiza*, Haller sent to Chatelain dried specimens of other plants. Chatelain thanked Haller in a letter of September 1759 for this material. Chatelain was still only Candidate of Medicine and had not finished his study with a dissertation. Obviously

*Corallorhiza trifida*.

Photo: David McAdoo



in connection with his correspondence with Haller about *Corallorhiza* and his own studies of the flowers – as wished by Haller – Chatelain decided to write his dissertation on *Corallorhiza*. He informed Haller about his intentions and mentioned also that he would name the one species occurring in Switzerland after Abraham Gagnebin. He also asked Haller to review his thesis. Haller answered soon and mentioned that a decision to name the plant as its own species would have to be taken by Chatelain alone. Haller also suggested that Gagnebin certainly would deserve the honor but also invited Chatelain to study the plant again very carefully in order to prove that the species would be different from the plants in Sweden and Lapponica which were in 1753 published by Linne as *Ophrys corallorhiza*. Chatelain submitted and defended the dissertation on 13 May 1760, which is the accepted date of publication. Its title was *Specimen Inaugurale de Corallorhiza quod Jussu et Autoritate Gratosi Medicorum Ordinis pro Summis in Inclita Rauracorum Universitate honoribus et Privilegiis Doctoralibus Legitime Obtinendi*. The dissertation itself was relatively short, and the author dedicated it explicitly to the ‘great’ Haller. Chatelain described first the genus *Corallorhiza* and then mentioned explicitly the ‘species prima’ *Corallorhiza trifida*. For synonyms he mentioned again explicitly Linne’s *Ophrys corallorhiza*, as dubious synonyms (*synonyma dubia*) he cited a long list of pre-Linnean names, including Rupp’s *Corallorhiza* (1718) and Haller’s *Rhizocorallon* (1745). We don’t know for sure whether Chatelain knew of the publication in 1755 by Gagnebin – he certainly knew Gagnebin himself - but we may assume that he didn’t because he did not mention it in his dissertation. We also don’t know why he did not name the plant, as announced before, after Gagnebin.

A second species Chatelain mentioned was *Corallorhiza ruppii* Haller, which was mentioned by Haller in 1742 - before Linne (1753) - in *Enumeratio Methodica Stirpium Helvetiae Indigenarum*. Haller did not make clear whether he meant *Corallorhiza* by Rupp (as a genus) or *Corallorhiza ruppii* (as species). Based on the assumption that Haller saw Chatelain’s dissertation before it was submitted, we may assume that Haller understood *Corallorhiza ruppii* as a species, and that Chatelain was correct to mention it as such. In the same year Haller persuaded Lachenal to take a trip through the Alps to collect plants for him. Lachenal convinced Haller to also pay the travel expenses for his friend Chatelain. Both started their excursion in June 1760 based on a very detailed traveling schedule by Haller. They crossed the Alps and collected plants on the southern slopes. At the end of July of the same year they both visited Haller in Roche and delivered the material. Obviously, both had been fascinated by Haller.

After the trip Chatelain was - based on some sources - in very bad health, and for some time it wasn’t clear if he would recover at all. Sometime after 1760 Chatelain went back to La Neuveville and started to practice medicine, although there already were several doctors in the small town. So, he had some free time left, which he used to start a political career. He became a member of

the town council and was later elected as town mayor. In addition, he still conducted botanical studies and collected plant material for Haller. Haller gave Chatelain copies of his botanical publications. But, more and more the tone used by Haller in his correspondence with Chatelain changed. He asked Chatelain to collect particular plants for him, and when Chatelain wasn't able to find those, Haller reacted rather harshly. Haller died in 1777, and we don't have any further information about Chatelain's activities until his own death in 1822. Chatelain never published in botany besides his dissertation, but he did help others, especially Haller, with material and his experience.

### **Author's remarks:**

Many of the cited old botanical publications are extremely difficult to obtain. Such books are generally seldom available in libraries, and many of them have been printed only in small numbers and over time some copies have been lost. The remaining books belong today to the guarded treasures of libraries and it is easy to understand that the possibilities to make reproductions of any kind have become very limited, if not impossible. In the case of Jean Jacques Chatelain we know according to Stafleu (*Taxonomic Literature*) of only one copy in the British Museum and a photocopy in New York. Additionally I found one copy in the library of the University of Basel which obviously Stafleu overlooked.

We don't know whether there are other copies in the estates of Gagnebin or especially Haller. Fortunately the publications by Haller are more or less complete and often more than one copy is available in various libraries in Bern. Unfortunately some of his works are in rather poor condition. This is mostly because pulp was used for producing the paper, and over time the resulting free acids have virtually disintegrated the paper. De-acidification of the paper and salvage of such books is technically possible but difficult, time consuming, and expensive. We have to fear that chances are rare for de-acidification of documents or books worth saving.

One solution to this problem is scanning of such important books, so at least the content can be saved in electronic form for future generations. The libraries generally have limited time, human resources, and infrastructure for such undertakings, and therefore we will have to accept that many of these bibliophilic treasures will become less accessible over time. Of many of these books – not of Chatelain's – there are microfiches existing, but unfortunately the quality is generally rather poor.

Because of the very generous assistance and the permission of the library of the Conservatoire Jardin Botanique Chambesey in Geneva and the library of the town and university in Bern, I had the possibility to make photocopies or slides of acceptable quality. Nevertheless the illustrations printed in this paper are leaving - concerning quality - some wishes open. In most cases they are repro-

ductions of photocopies. In spite of this fact, this article gives the possibility to show at least some of the drawings and illustrations from those old and famous botanical books.

### References:

- Chatelain, J.J. 1760. Specimen Inaugurale de Corallorhiza quod Jussu et autoritate gratiosi medicorum ordinis pro summis in inclyta Rauracorum Universitate honoribus et privilegiis doctoralibus legitime obtinendi p. 8.
- Gagnebin, A. 1755. Acta Helvetica Physico-Mathematico-Anatomico-Botanico-Medica 2:56 – 75.
- Haller, A.von. 1742. Enumeratio Methodica Stirpium Helvetiae Indigenarum, p. 278.
- Haller, A.von. 1745. Flora Jenensis Henrici Bernardi Ruppilii, ed. 2, p. 301.
- Haller, A.von. 1795. Icones Plantarum Helvetiae, edition 1, p. 54 – 55, t. 48.
- Linne, C.von. 1753. Species Plantarum 2:945.
- Rupp, H.B. 1718. Flora Jenensis (Edition 1) p. 284, t. 2.

**Editor's note: This is Part II of a 3-part series. Part III will appear in the next issue of NOCJ.**

This article was adapted from a previously published version:

- Jenny, R. 2002. *Corallorhiza*: Die Gattung und ihr geschichtlicher Hintergrund (The genus and its historical background). Die Orchidee, Jahrgang 53, 5. September 2002, Beiheft 7.



*Corallorhiza maculata*.

Photo: Ron Coleman

## **Mycorrhizal Specificity and Function in Myco-Heterotrophic Plants**

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This article is a summary of part of a chapter in *Ecological Studies*, Vol. 157, entitled Mycorrhizal Ecology by D.L. Taylor, T.D. Bruns, J.R. Leake, and D.J Read.

I would like to thank Lee Taylor for kindly giving permission for it to be included herein, and for checking what I have written.

### Glossary

Achlorophyllous – having no chlorophyll.

Anastomosis – the fusing together of fungal hyphae.

Angiosperm – a plant producing flowers and seeds.

Autotrophic plant – a plant able to fix its own carbon.

Chlorophyll – a green plant pigment involved in photosynthesis.

Ecto-mycorrhiza (EM) – an association of fungi and (usually tree) roots characterized by a sheaf of hyphae on the surface of the root tip. The hyphae penetrating into the roots are involved in carbon transfer.

Heterotrophic plant – plant that is unable to fix its own carbon.

Myco-heterotrophic plant (MHP) – plant that receives carbon compounds from a fungus.

Mycorrhiza – a symbiotic association of fungus and plant.

### Summary

Dependence on fungal derived energy sources has arisen independently on multiple occasions during the evolution of land-based plants. There are approximately 400 fully myco-heterotrophic angiosperms, in many different taxa, known at this time; more than one third of these are orchids. Myco-

heterotrophic plants (MHPs) can be divided into groups – those that have totally lost their ability to fix carbon, and those, which at least in later stages of the life cycle, have some autotrophic capability, and can therefore be regarded as partially MHP. Fully MHP plants represent one end of an evolutionary continuum in which plants at the other end show no dependence upon fungi for a supply of carbon.

Most orchids produce large numbers of dust like seeds, lacking substantial energy reserves, and typically highly adapted for wind dispersal. The lack of substantial energy reserves in the seed is the reason that orchids and other MHPs in nature form mycorrhizal associations in order to grow. While most orchids eventually produce green leaves to carry out photosynthesis, fully myco-heterotrophic orchids rely on fungi for their nutritional requirements. The fungal hyphae form coils and are found in certain cortical cells, these coils are called pelotons (Figure 1).

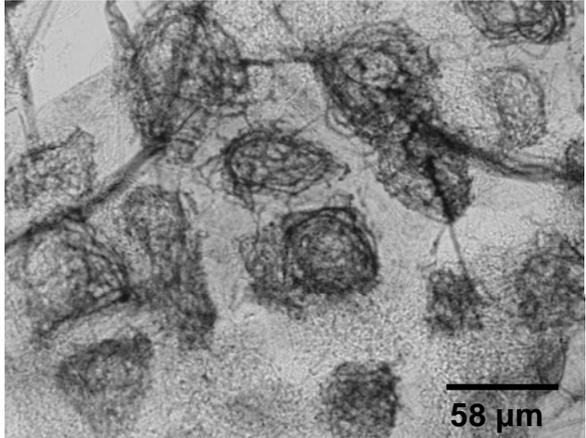


Figure 1. An example of fungal pelotons inside the cortical cells of orchid roots.

Photo: Jyotsna Sharma

The authors have found that a number of the orchids that contain green pigment (chlorophyll) associate with a wide range of fungi, and hence have little specificity. They have also found that some other species of orchids that contain green pigment, and all achlorophyllous orchids, associate with one, or only a few species of fungi. In several species of orchid this high specificity has been shown to apply from seed germination to adulthood in nature. Some achlorophyllous orchids associate with wood-decay or parasitic fungi. Researchers in Australia have found that some species of orchid are restricted to associations with a single fungal species.

Most species of plants however display little specificity. When seed is germinated in vitro, the high specificity found in nature may not apply. In addition to the normal mycorrhizal relationships, radioactive tracer studies have shown that autotrophic ecto-mycorrhizal (EM) host plants can provide carbon to nourish MHPs that are linked by a shared fungus. Many of the known fully MHPs

are known to have EM relationships. Partial MHPs are even more widespread, and many orchids with green pigments fit into this category.

Just as apple varieties can be grouped according to their ability to pollinate each other, fungi can be grouped according to their ability to fuse hyphae (anastomose) with each other. Masuhara et al (1993; 1994) showed that in vitro germination and growth of partial MHP *Spiranthes sinensis* was stimulated by strains of 23 multinucleate or binucleate anastomosis groups of fungi. In the field however seeds planted out were colonised by a single fungal species (*Rhizoctonia repens*) in 26 out of 27 cases, even though 7 different *Rhizoctonia* anastomosis groups were present. Isolates from these groups (obtained from the sites) were shown to be able to simulate germination and growth in vitro even though they were not associated with plants in the field. Patterns of specificity have been correlated with the distribution patterns of fungi and habitat variation in a number of MHPs. It was found that different orchid species growing in the same location often harbored the same *Rhizoctonia* strains, while a single orchid often harbored different *Rhizoctonia* strains in each distinct habitat in which it was found. In a number of tests using fungi isolated from one species of adult orchid, it was often found that the fungi were ineffective at germinating the seed of that species, but would stimulate germination in the seed of other species of orchid.

Other plant studies have shown that the outcomes of particular plant-fungus interactions in vitro are highly dependent on the exact nutrient conditions of the growth medium, and that fungal isolates lose their symbiotic potential over time when maintained in culture. These factors may have contributed to inconsistencies in laboratory germination studies.

Molecular phylogenetics and ultrastructural methods are helping to resolve the problems of identification and taxonomy of fungi, and of discriminating between mycorrhizal and non-mycorrhizal isolates.

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While the above clearly answers a number of questions about orchids, and explains some of the problems experienced by amateurs when raising orchids from seed, it also implies that protection of the exact sites where both the orchids and the fungi occur is needed. It also possibly explains the problems that are encountered when relocating some species of orchid. Finally it has also suggested many more questions which we did not realise needed to be asked.



## Fire on the Mountain: The Second Year

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The Santa Catalina Mountains lie along the northern side of Tucson, Arizona (AZ). The entire range is contained within Pima County. The base of the mountains is in the Sonoran Desert, but the winding Catalina Highway up the mountain transverses many vegetative life zones, starting in a forest of Saguaro cacti (*Carnegiea gigantea*) and ending at about 8,000' elevation in a world of pine and fir trees and running streams. Mount Lemmon at 9,157' is the high point of the range. Coleman (2002) lists 13 orchid species native to Pima County. Of these, 10 grow on the Catalina Mountains and are listed in Table 1.

Table 1. Native orchid species in the Santa Catalina Mountains

Species	Verified by the author	Grows in Marshall Gulch
<i>Corallorhiza maculata</i>	X	X
<i>Corallorhiza striata</i>	X	X
<i>Corallorhiza wisteriana</i>	X	X
<i>Epipactis gigantea</i>		X
<i>Listera convallarioides</i>	X	X
<i>Malaxis abieticola</i>	X	X
<i>Malaxis porphyrea</i>		X
<i>Malaxis soulei</i>	X	X
<i>Platanthera limosa</i>	X	X
<i>Schiedeella arizonica</i>	X	X
<i>Dichromanthus michuacanus</i>	X	

The author has been unable to relocate either *Epipactis gigantea* or *Malaxis porphyrea* in the Santa Catalina Mountains despite repeated searches. *Epipactis gigantea* has two historical locations on the mountains. Plants were found

at the lower elevations of Sabino Canyon in 1905 and in Marshall Gulch in 1907. The author is not aware of any sighting since then. *Malaxis porphyrea* was reported from Marshall Gulch in 1908.

Marshall Gulch, at the end of the Catalina Highway, is an almost magical place for orchids with 9 of the 10 species in the mountains recorded from there (see annotations in Table 1). Five of the species in Marshall Gulch are widely scattered on the mountains, but the others deserve special mention. *Malaxis abieticola* (Figure 1) is relatively rare in the United States. It is recorded from only



Figure 1. *Malaxis abieticola*.

three locations in New Mexico and another two in southeastern Arizona. The largest population in Arizona is in the Chiricahua Mountains, but a small population with four groups of plants has been documented in the Santa Catalina Mountains, all in Marshall Gulch. A small group of *Listera convallarioides* (Figure 2; page 19) at the upper end of Marshall Gulch is the southern most location of this species. *Platanthera limosa* (Figure 3a, 3b; page 19), also rare in the United States, is known from 5 sites in the Santa Catalina Mountains, but the largest colony was along the banks of the stream and on the canyon bottom in Marshall Gulch.

Disaster struck the Santa Catalina Mountains on 16 June 2003. What became known as

the Aspen Fire (Figure 4; page 20) was started by human activity in the area of Marshall Gulch. When the fire was finally out on 11 July it had consumed over 85,000 acres of the Coronado National Forest in the Santa Catalina Mountains and destroyed 340 homes and businesses in the community of Summerhaven near Marshall Gulch. It also destroyed the prime orchid habitat in Marshall Gulch and in other places in the Santa Catalina Mountains.

Due to safety restrictions following the fire, access to the burned area was limited until 30 July of 2004. The rest of this article addresses an assessment of damage to orchid habitat and populations in the second year after the fire. The author also intends to track orchid recovery in this area over the long-term.

Figures 2 and 3 from 'Fire on the Mountain: The Second Year' by Ron Coleman (page 17).



Figure 2. The southern most colony of *Listera convallarioides* may have been destroyed by the fire.



Figure 3. *Platanthera limosa*. (3a) A plant of *P. limosa* after the fire. (3b) Close-up of flowers.

Figures 4, 5, and 7 from 'Fire on the Mountain: The Second Year' by Ron Coleman (page 17).



Figure 4. 'Aspen Fire' in the Santa Catalina Mountains near Tucson, Arizona, USA on 16 June 2003.



Figure 5. *Corallorrhiza maculata* capsules showed some plants survived the fire on a road cut.

Figure 7. *Malaxis soulei* blooms after the fire in a lightly burned area.

Figures 1 and 2 from 'Fakahatchee Strand State Preserve and Corkscrew Sanctuary in Florida' by Mike Parsons (page 32).



Figure 1. *Prosthechea cochleata* var. *triadra*.

Figure 2. *Campylocentrum pachyrrhizum*.





Figures to accompany  
'Fakahatchee Strand State Preserve  
and Corkscrew Sanctuary in Florida'  
by Mike Parsons (page 32).

1. *Epidendrum rigidum*.
2. *Epidendrum amphistomum*.
3. *Vanilla phaeantha*. 3a. Plant.  
3b. Flower.

Photos: David McAdoo



The burned area is both distressing and encouraging. Vast areas are totally blackened and the once lush forest is bare, dead trees, or in some places more simply ashes because the entire forest was consumed. Other areas did not burn as fiercely so that the trees survived and only the fuel load on the ground burned. In these areas new growth is abundant and the forest floor is covered with ferns, grasses, annuals and perennials that evolved with fire. Even in the scorched regions some oaks and aspens are crown sprouting and grasses are appearing, but it will be many decades before pines and firs dominate again.

The trail into Marshall Gulch is blackened and the off-trail areas are covered with charcoal instead of pine needles. Along much of the Gulch the fire burned to the streambed. But even here where the fire started and was at times most intense, patches of unburned forest and live trees remain. However the evidence of orchid loss increases with each step. In an area once thick with *Corallorhiza maculata* (Figure 5; page 20), not a single plant is seen. While this visit is at a time which is well past the blooming season, spikes with capsules normally can be seen this time of year. A little further in, a hillside that usually has dozens of leaves of the early blooming *Schiedeella arizonica* (Figure 6) yielded not a single plant. Nor did several other spots along the trail where it was once frequent. All four spots where *M. abieticola* had been found were devoid of plants and the burn appeared to have been very intense there. Because the forest cover had burned away, the summer monsoon rains had a devastating impact and the heavy runoff denuded the stream banks and stripped away colonies of *P. limosa* that once lined the stream. There was no evidence of *L. convallarioides*, which is normally in bloom in July, and the southern-most colony of this orchid may have been eliminated. Though not unexpected, the realization of the fire's impact was hard to accept.

Some orchids did survive the fire within those areas that miraculously did not burn. Even though the author estimates that 90% of the plants were destroyed, in a small upstream area three plants of *P. limosa* were found and one was blooming. Farther downstream in zones apparently skipped by the fire, *P. limosa* was in bloom even though only a few yards away nothing was growing after the burn. With these remaining plants there is



Figure 6. *Schiedeella arizonica*.

a potential source for re-seeding of *P. limosa* as the Gulch recovers. Also within this protected area was one capsule laden spike of *Corallorhiza wisteriana* that had bloomed earlier in the season; usually dozens bloomed along this trail.

Along the road cut within a few hundred yards of the trailhead, *C. maculata* capsules provided evidence that plants had bloomed here after the fire. The road cut bank had little or no fuel to burn and the soil here probably stayed much cooler than the surrounding forest floor allowing the plants to survive. Just above the road cut, in an area lightly burned by the fire, three plants of *Malaxis soulei* (Figure 7; page 20) were in spike. Though shallowly rooted, the mild fire here did not claim them.

Later in the summer of 2004 the author visited a colony of *Dichromanthus michuacanus* (Figure 8) that he has observed for several years. The forest near



Figure 8. *Dichromanthus michuacanus*.

the colony was severely burned and only three plants were found where over 30 plants grew in 2000 and 2001. One plant had attempted a flower spike, but had aborted it. Two of the plants were in the shelter of a rock at the edge of the trail, and the third a short distance away. Data from 1999 to 2004 are shown in Table 2.

Table 2. Number of all plants of *Dichromanthus michuacanus*.

Year	Number of flowering plants	Number of all plants
1999	5	18
2000*	2	35
2001	3	36
2002	6	not available
2003**		
2004	1	3

\* most plants eaten off close to ground

\*\* not accessible due to fire closure

Perhaps most distressing was the observation that all the *Juniperus deppeana* (alligator juniper) within over 100 yards of the *D. michuacanus* had been destroyed by the fire and stood as mere charred reminders of their former grandeur. This is disconcerting because *D. michuacanus* always grows in association with alligator juniper, which suggests some sort of indirect dependency. With the death by fire of the junipers, this *D. michuacanus* colony might slowly disappear over the next several years. Even though some plants survived the flames, they will not survive the aftermath. About 0.5 mile down the trail a single plant of *D. michuacanus* that the author has observed since 1999 was growing in an unburned area and had a spike; so a potential source of seeds remains. Other orchid species that grew in the forest along the trail to the *D. michuacanus* location had been reduced greatly in numbers but offer hope for the future. *Malaxis soulei* was in bloom in several spots that had burned and two stalks of *Corallorhiza wisteriana* with capsules from this season were in lightly burned areas.

The fire was devastating, and its impact on orchid populations will be long lasting and perhaps permanent. The southern-most colony of *L. convallarioides* may have been destroyed. All *M. abieticola* in the Santa Catalina Mountains may have burned, as have most of the *D. michuacanus*. But there is also hope. Orchids survived in unburned tracts of forest, and in lightly burned regions. It remains an interesting study to see how long and extensive the orchid recovery will be.

**References:**

Coleman, R. A. 2002. The Wild Orchids of Arizona and New Mexico. Cornell University Press, Ithaca and London.

## Field Trip Etiquette

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My wife Joan and I enjoy field trips. They have taken us to areas that we would normally never see and we have been introduced to plants that may take us hours, days, weeks, or sometimes years to find on our own. The knowledgeable leaders have taught us about the geographical area we are in, the plants we see, their common and scientific names and many of their specific characteristics. Most of all we enjoy the camaraderie of others who have similar interests.

Ensuring an enjoyable field trip requires a great deal of preparation by the leaders and the co-operation of all participants.

As participants, we can contribute to the success of the field trip by adhering to some simple guidelines:

### **Some do's:**

**Do be punctual.** Field trip leaders spend a great deal of time preparing a schedule for the field trip. One late participant can disrupt that schedule.

**Do avoid the "Three Little Pigs Syndrome."** We have participated in field trips where; as we arrive at the meeting place at the prescribed time, others are already returning! Part of the enjoyment of field trips is being together as a group.

**Do listen to the field trip leader.** The leader will provide information on where you are going, how to get there, and other pertinent details. Ensure that you are present at the pre-trip meeting and give them your "undivided" attention.

**Do car pool.** The fewer vehicles, the better. It is easier to stay together when travelling, it is safer, it is easier to find parking at the site, and we are demonstrating our concern for the environment. Besides it is an excellent opportunity to visit with friends, or make new friends!!

**Do dress appropriately.** Sandals and shorts may be appropriate for the beach, but not for a mosquito infested black spruce and tamarack bog. Wear clothing and footwear suited to the field trip location and the weather conditions. Most field trips are "rain or shine" - be equipped with protection from the sun or rain, hot weather or cold! Do remember your hat!!

**Do be prepared.** On a field trip, a small back-pack is a handy item to have for storing your note book and pen, field guide, magnifying loupe, insect repellent, water, extra film and other necessary items.

**Do ask questions.** This is the best way to learn, and others love to share their knowledge.

**Do share your "finds."** If you see something that you consider of interest, advise the field trip leader. It may be "something special" that everyone will want to see.

**Do stay on trails.** Trails are designed to take you to the most interesting features of the area and in a manner that will be least disruptive to the environment. Straying off the trails will disturb the natural beauty and balance of the area that others enjoy.

**Do be careful.** Photographers - tie back vegetation that is in your way. Be careful not to trample the vegetation around your subject. If you have to kneel or lie down to get a photograph - do it with care and using a right angle viewfinder can help.

**Do respect Private Property.** Obtain permission from the owner of private property before you enter.

### Some don'ts

**Don't dawdle.** The field trip leader knows where specific points of interest are. By dawdling you may miss these. For safety reasons it is best to stay together.

**Don't hog the plants.** We all want to get the very best photograph of that special flower. Plan to revisit the area later if you want to spend time getting that perfect shot. Remember that others in the group may wish to get a photograph as well.

**Don't trample.** If the group is visiting an area where there is no designated trail - be *extra* careful not to trample vegetation. Pay particular attention to where you place your feet. Do not approach a plant of particular interest to you with reckless abandon. You may be trampling other significant plants along the way.

**Don't step backwards.** Most plants are trampled when individuals back up. If you have to move back to take a photograph or get out of the way - turn

around first. Unless you have eyes in the back of your head, you may be trampling the flower that someone else may wish to look at or photograph. Can you believe that a 46 cm (18 inch) plant of *Platanthera orbiculata* can be trampled? It happens!!

**Don't dig plants.** Digging plants is a selfish act. The plants are there for everyone to enjoy. Be "conservation" minded.

**Don't pick the flowers.** Picking flowers is a selfish act. Remember - the plants are there for everyone to enjoy. In addition, picking the flowers of some plants will weaken the plant, making them more susceptible to insects and disease.

**Don't complain.** Yes the insects may be bad, the terrain tough, and the weather may be miserable. However, a positive attitude will temper even the worst conditions and will create a pleasant atmosphere for a successful field trip.

**Don't monopolize the leader.** Enough said!



Photo: Lorne Heshka

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## Step Softly: Environmental Stewardship

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Spring is in the air! Native orchid enthusiasts are gearing up for another year of discovery and enjoyment of their favorite blooming beauties. Photographers are hoping to find the species that eluded them previously. Others including myself are looking forward to initiating or continuing long term tracking studies. Now is a good time to consider the relative impact of all those feet on the orchids and their environment.

Believe me, even one person moving carefully through the forest has an impact. Several people following in those same footsteps multiplies the trampling effect. Damage to fragile ecosystems such as bogs and fens may be more quickly apparent but all habitats are vulnerable to foot traffic. Ironically, it is the recent popularity of the 'great outdoors' that exacerbates the problem. The very orchids that interest us may disappear as a result of our forays unless we consider the impact of what we do (Penskar and Higman, 2000; Meleg, 2003). Studies in Finland, Ireland and Switzerland have measured the effect of trampling on forest trees, tree seedlings, ground cover plants and on the soil microbial community. The first plants to disappear are tender herbs like mosses. "With only minimal trampling 20 peatland species are lost" (MacGowan, 1996). In a Finnish study, the microbial community structure of the humus layer in an urban forest was affected by a cascade of events beginning with trampling then extending to changes in vegetation and litter quality which ultimately affected humus pH (Malmivaara-Lämäsa and Fritze, 2003). The Swiss study by Waltert et al. (2002) investigated the impact of trampling on the mycorrhizal roots of seedling and mature trees. Not only did they report that trampling caused considerable damage to forest floor vegetation but it especially affected seedling trees and their mycorrhizal fine roots.

We do not yet have a measure of the indirect effect of trampling on orchids but there are reports of the deleterious effect of leaf damage and removal. When leaves of *Dactylorhiza maculata* and *Tipularia discolor* were removed in whole or in part experimentally, plants became progressively smaller and were less likely to flower the following year (Whigham, 1990; Vallius and Salonen, 2000). Effects of human visitation and touch on plant growth and herbivory have been documented for species other than orchids (Cahill Jr., Castelli and Casper, 2002; Hik et al. 2003). Because we do not yet know enough about the impact of human visitation on orchids, we must minimize disturbance when we visit sites to photograph or otherwise study them. We must take care.

So how do we minimize any damage we may cause?

- A Consider the habitat and its relative fragility. Wetlands are especially vulnerable and should be visited with great caution and preferably not in large groups.
- B Consider the orchid and its rarity. While we may want to see the 'rare' ones, it might be best to leave a fragile site or a small population completely undisturbed. When in doubt, please don't.
- C Consider the orchid and its ecosystem. Orchids do not live in isolation. They have a complex life cycle and a reliance on particular habitat conditions to survive. Human visitation can lead to soil compaction, changes to the soil microflora and loss of vulnerable species.
- D Walk softly and carefully. Even common orchids like the Helleborine (*Epipactis helleborine*) deserve our consideration and respect if we expect to learn something meaningful about their behavior. Ever since I began a study in 1985, I have limited my visits to the absolute minimum needed to gather data, have walked on exposed rocks wherever possible to minimize disturbance, and have resisted moving companion plants that were spoiling my view. I wear running shoes which are less potentially damaging than hiking boots.
- E Be an exemplary environmental steward. Stay on paths and walkways where they are provided and especially where the park respectfully requests that you do so.

## Acknowledgements

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## References:

- Cahill Jr., J.F., J.P. Castelli and B.B. Casper. 2002. Separate effects of human visitation and touch on plant growth and herbivory in an old-field community. *American Journal of Botany* 89: 1401-1409.
- Hik, D.S., M. Brown, A. Dabros, J. Weir and J.F. Cahill Jr. 2003. Prevalence and predictability of handling effects in field studies: results from field experiments and a meta-analysis. *American Journal of Botany* 90: 270-277.
- MacGowan, F., 1996. Irish Peatland Conservation Council. 1996. These Bogs Weren't made for Walking <http://www.ipcc.ie/infotrampling.html>.
- Malmivaara-Lämäsa, M. and H. Fritze. 2003. Effects of wear and above ground forest site type characteristics on the soil microbial community structure in an urban

- setting. *Plant and Soil* 256: 187-203.
- Meleg, E. 2003. Help preserve our orchids. Bruce Peninsula Orchid Festival. [http://www.northbruce.cck.ca/bruce\\_peninsula/flowers/orchid\\_festival\\_2.htm](http://www.northbruce.cck.ca/bruce_peninsula/flowers/orchid_festival_2.htm)
- Penskar, M.R. and P.J. Higman. 2000. Special plant abstract for *Platanthera leucophaea* (eastern prairie fringed-orchid). Michigan Natural Features Inventory, Lansing, MI. 3 pp. [http://web4.msue.msu.edu/mnfi/abstracts/botany/Platanthera\\_leucophaea.pdf](http://web4.msue.msu.edu/mnfi/abstracts/botany/Platanthera_leucophaea.pdf)
- Schnitzer, S.A., P.B. Reich, B. Bergner, and W.P. Carson. 2002. Herbivore and pathogen damage on grassland and woodland plants: A test of the Herbivore Uncertainty Principle. *Ecology Letters* 5: 531-539.
- Vallius, E. and V. Salonen. 2000. Effects of defoliation on male and female reproductive traits of a perennial orchid, *Dactylorhiza maculata*. *Functional Ecology* 14: 668-674.
- Waltert, B. V. Wiemken, H.-P. Rusterholz, T. Boller and B. Baur. 2002. Disturbance of forest by trampling: Effects on mycorrhizal roots of seedlings and mature trees of *Fagus sylvatica*. *Plant and Soil* 243: 143-154.
- Whigham, D.F. 1990. The effect of experimental defoliation on the growth and reproduction of a woodland orchid, *Tipularia discolor*. *Canadian Journal of Botany* 68: 1812-1816.



*Epipactis helleborine*

Photo: Ron Coleman

## **Fakahatchee Strand State Preserve and Corkscrew Sanctuary in Florida**

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According to the author of 'Wild Orchids of Florida' by P.M. Brown (2002) there are 118 species and varieties of orchid growing in Florida, of which 106 are considered native. Of the 118, fifty-six are listed as endangered, 17 threatened and 2 are commercially exploitable. About 15 species have not been seen for some time or have possibly been mis-recorded.

In Fakahatchee Strand State Preserve (FSSP) in southwest Florida, 43 orchid species have been recorded, and this is the largest concentration of orchids in North America. But, in talking with the resident ranger, who has been there nine years, I learned that he has only seen 36 of these. The FSSP lies in the southwest corner of the state just above the Everglades National Park (ENP) but with an entirely different sort of an ecosystem, and it contains practically all the epiphytes that have been recorded in Florida.

I first learned of the FSSP over 10 years ago, and after reading the much-valued book 'The Native Orchids of Florida' by Carlyle A. Luer, it was on my list for a visit. So after arriving in Florida, I made my way to this fabled site by going down a road called 'Jane's Scenic Highway' that cuts the FSSP in half and seems to lead to nowhere. I believe that this road was made after WWII to take out all the bald cypress – a much-valued tree. The highway was then cut up into tramways to allow the trees to be felled and moved.

My first visit did not yield a single orchid, so when I found out that they now have swamp walks through the sub-tramways, I was on the phone and e-mail to book myself a place. I was interested to see where all these orchids hid. Booking a spot was not as easy as it sounds as they never answered my e-mails, nor returned my voice messages. These rangers are extremely busy, as they have to look after an enormous amount of acres. This year I thought I was in luck as I got through on the phone and asked whether there were any walks during March when I would be in Florida. The reply was – 'yes, only one and it was full.' After my tale of woe they agreed that I could come down, as there would surely be a cancellation.

I contacted a friend to ask for his advice and to let him know I was going. He said that on my travels I should find *Sacoila lanceolata* var. *paludicola* (Fatahatchee beaked orchid), which is a beautiful red flowering terrestrial species that was once included in the *Spiranthes* family, and *Ionopsis utricularioides* (the delicate ionopsis), a purple-lilac epiphyte orchid that grows on

slender twigs. Both are March specialities in the preserve. He gave us further instructions saying that the *Sacoila* grew in wet areas, possibly on fallen trees by the path, and that the *Ionopsis* would be found next to the largest culvert along the track; and I may even have to wade several yards to an area which would have several plants. I was also told that one plant had grown on a tree by the path and that it had been stolen!

So, my wife Carol and I booked a room at Murphs motel in Everglades City (a place miles away from civilisation) and set out early in the morning to the FSSP. By 10:00 AM several people had turned up and we were split into two groups – one for the swamp walk and one for roaming the dry paths. We chose the swamp walk, as this would take us to more orchids. What we didn't realise was that we would have to wade into the water up to our thighs - knicker line of our trousers - to enable us to roam the sub-tramways which were now full of water and re-gaining their jungle look. There was one ranger and a volunteer helper with the party that consisted of four other people. We were each handed a large pole to steady ourselves and to be able to feel out sink holes. This extra support was essential if you were carrying valuable camera equipment that had to stay dry.

It wasn't long before we descended into the muddy water that strangely enough was warm and quite refreshing from the heat of the sun. We were surprised that there were no mosquitoes here and when I mentioned it to the ranger, he seemed surprised that I had asked such a question; he just replied that the fish eat them. My other concern was for the alligators, moccasins, leeches, poison-wood, and just being disorientated. It was then that I was introduced to the jumping spider. The volunteer reached into a hole in a tree and pulled out a huge dead spider the size of a tarantula. 'This was its nest' he told me; thank goodness that this was not the mating season. A little later, we had to divert from an area that was known to be where snakes were nesting. We took the advice and stayed clear of that particular channel.

We then came to an area full of rare orchids and ferns! There were eight species of orchid, but only two were flowering; *Epidendrum amphistomum* (see photo on page 22), the dingy-flowered star orchid that was far from dingy that the ranger preferred to call it. It looked like a plastic, greenish-brown orchid in a cluster, but was quite beautiful when the sun shone on it through the trees. The other orchid in bloom was *Prosthechea cochleata* var. *triadra* (Florida clamshell orchid; Figure 1; page 21) and the last flower had just started to fade. I had seen this orchid before in Corkscrew Sanctuary; it is extremely pretty and like its name suggests, it looks like a clamshell. The species looked a lot different here hanging over the water in an eerie setting with its seed capsules rising like a cock's comb. The other orchids were: *Epidendrum rigidum* (rigid epidendrum; see photo on page 22) that does have a rigid appearance, and *Epidendrum nocturnum* (night, fragrant epidendrum) that has a white triangular

flower and as its name suggests has a scent at night to draw the moths. This too I had seen in flower at Corkscrew on a previous occasion. We also saw *Encyclia tampensis* (butterfly orchid), which is relatively common. Another species we spotted was *Habenaria odonopetala*, which is a common terrestrial orchid and was growing from the base of a tree; it had just finished flowering. The last two were two of the three known leafless orchids: *Campylocentrum pachyrrhizum* (ribbon spur orchid; Figure 2; page 21), an unusual orange hanging orchid; and *Dendrophylax lindenii* (ghost orchid), which was made famous by the book *'The Orchid Thief'* by Susan Orleans. The ranger showed me how to tell the difference between the leafless orchids by their roots that tangle round the tree like an octopus. The ghost orchid has white spots scattered around on the root system as if it had a disease. The orchid normally has one white flower that springs out from the tree in a ghostly fashion.

We stopped at midday for lunch and were happy that we had brought sandwiches and drinks, as we were not aware that we had another session in the afternoon. We didn't see anything new in the afternoon and the time passed away quickly. The session finished at about 3:30 PM and then we realised that we still hadn't seen the *Sacoila* or the *Ionopsis*. We had asked at lunchtime from the dry-land-walkers if they had seen any orchids on route, as I knew they had passed the culvert and the bend where both orchids were known to occur. But, they apparently had not seen any orchids at all so I was pleased that I had chosen to go on the swamp walk. The ranger and the volunteer were ready to go home, so I asked them if they were aware of the orchids. They thought that the plants were not out yet.

Now Carol and I were on our own and we thought that after coming all this way we should at least have a look. We were not far from the tramway which led up to the large culvert, and we knew that we would have to walk about a mile on a track which is just wide enough for one vehicle. Just as we neared what we thought was the right culvert, there in front of us was one of the largest alligators I have ever seen. Alligators, unlike the crocodile, are meant to have a natural fear of humans, but I had a feeling that this one was not going to move regardless of what I tried. This proved correct as my singing and banging did not have any impact on him whatsoever. I wasn't sure whether I really wanted to wade next to the culvert with him around or go round the bend on the path as he may block the escape route later on. We decided to give up.

On walking back down the path we met two couples approaching us. This was very unusual at this time of day as we were miles away from anywhere, so I asked them where they were heading. They said they had come a long way and were looking for orchids because they had seen the film *'Adaptation,'* which is somewhat based on the book *'The Orchid Thief.'* I asked them if they had seen any orchids as of yet, but they replied 'no.' I told them my story, and they thought they could easily get rid of an alligator, so we all turned around

and headed back to the culvert. Try as they did, this alligator did not scare easily. We all finally gave up. These alligators can move extremely fast as my good friend Russell Clusman can testify. He had to fight one off in this area after it had grabbed him around the leg. Luckily he is a strong man and had the right equipment on him to enable him to fight back and make the alligator release him.

On the way back we thought that because we now know our way around, we could return the following week and try again. We had made arrangements to go to the ENP that weekend which, although is in the south of Florida, is still over 100 miles away. It was still nearer for us as we were staying near Orlando, which is a lot further north. Also we felt that an early start would be most beneficial as alligators are cold-blooded creatures, and it takes them a long time to warm up. In other words, we thought that there was no chance of attack by the alligators if we went very early.

The following weekend we visited several sites on our way south, including Corkscrew Sanctuary, which is a very large Audubon reserve (the only one in Florida). Corkscrew is found just north of the FSSP and has a very similar ecosystem, but more bald cypress trees. We were told by Paul Brown that five orchids were in bloom: 1) *Spiranthes vernalis* (spring ladies' tresses); 2) *Spiranthes praecox* forma *albolabia* (giant ladies' tresses); 3) *Bletia purpurea*



*Bletia purpurea*. Photo: Mike Parsons

( p i n e  
pink); 4)  
*Cyrtopodium punctatum*  
(cow horn  
orchid;  
Figure 4);  
and 5)  
*Saccola lanceolata*  
var. *paludicola*.  
T h e r e  
w e r e  
a b o u t  
2 0  
p l a n t s  
o f  
*Saccola lanceolata*  
var. *palu-*

*dicola* growing quite near the boardwalk in the wet surroundings. I thought that this red orchid stood out amongst its dark background, but it was surprising how the regular sightseers missed it. It was a wonderful sight. Then we

headed for Murphs at Everglades City passing warning signs not to hit the Florida panther. As if we would; it would have been a great pleasure just to see one.

The next day Carol and I arose early and arrived at FSSP by 9:00 AM to go back to the tramway and walk to the culvert. With no sign of the alligator, we looked around for the *Sacoila* but found none. We were later told that they had not come out yet which was surprising as they were out in Corkscrew further north. Then after carefully looking around I went into the water alone and waded up to my waist. I was told the *Ionopsis* were only a few yards away but none seemed to appear. I crossed over a few more logs but still no orchids. We were both getting quite anxious by now so we decided to give up. We



*Cyrtopodium punctatum*

Photo: Mark Larocque

were headed back to the car when Mike Owen and Karen Relish arrived in their jeep along the trail. We were due to meet them the following day in ENP mainly to find the mule eared orchid at its only known location. So we were very pleased to see them and they were surprised to find us here. Then we told them that we were looking for the *Ionopsis* and they asked whether we had found it. I told them my story and they confirmed I was looking in the right place and offered to help me. I gratefully accepted. We went back to the culvert and waded into the area I had originally reached but this time we crossed over a different log and there before our eyes were two sets of *Ionopsis* in bloom dancing above on twiglets. There were two more plants that had not flowered, and a wild vanilla orchid (*Vanilla phaeantha*), which also was not in flower. I was overjoyed and tried to persuade Carol to go in, but she was reluctant until Mike Owen said that you haven't come 5,000 miles not to do the last stretch. So Carol waded in! As we both were just returning to the bank we found another plant in bloom within touching distance of the path.

We were then on our way to the ENP, but that's another story.....



## End Notes

### Sincere regrets...

Our apologies to Bill Steele and readers for the omission of the following from the report of the Native Orchid Conference, 2004, which was published in NOCJ 1(4): 1-7.



Bill Steele, Spangle Creek Labs, Minnesota, recounted his 'Joys of *Cypripedium* Micropropagation.' He started working with *Cypripedium parviflorum* and *Cypripedium reginae* in the late 1980s and pioneered successful seed germination of our native, terrestrial orchids. Read one of his papers "Large Scale Seedling Production of North

American *Cypripedium* Species" in C. Allen, ed, North American Native Terrestrial Orchids Propagation and Production (1996). He also shares his knowledge and experience through his web site <http://www.uslink.net/~scl/>



### 2005 NOC Annual Conference Coming Soon!

We will meet this year in **Winnipeg, Manitoba, Canada** from **9 - 12 July** for our fourth annual conference. One day of the conference will feature talks devoted to *Platanthera praeclara* (western prairie fringed orchid), many other topics will be covered on the second day of presentations. The field trips include a visit to the Manitoba Tall Grass Prairie Preserve in southeastern Manitoba and a visit to a fen of particular significance as well as to other interesting orchid sites.

### **Conference Location:**

St. Benedict's Conference & Retreat Centre  
Winnipeg, Manitoba Canada

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For a Conference Brochure, please visit <http://groups.yahoo.com/group/nativeorchidconference/>



### **Logo Contest (Reminder!) - Closing date EXTENDED**

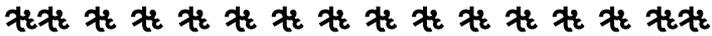


Here is a great opportunity to represent the Native Orchid Conference, Inc., AND to win a one-year membership free...

We invite submissions of logo designs, which if selected, will serve as a symbol for the organization. The logo may be placed on the cover of the Journal, on t-shirts, tote-bags, and other accessories. The artist whose submission is selected also will win free NOC membership for one year!

Please submit your design(s) electronically (high resolution TIFF files to [jsharma@ifas.ufl.edu](mailto:jsharma@ifas.ufl.edu)) or by post to: Dr. Jyotsna Sharma, Univ. of Florida, 155 Research Road, Quincy, FL 32351. Please include a statement indicating that if selected, you permit NOC, Inc. to use your design as needed.

**EXTENDED Closing date – Sunday, 15 May, 2005.** This should still allow us time to use the selected design on Conference paraphernalia!



### **Pictorial Orchid Flora Project (Reminder!)**

The Native Orchid Conference has launched a Pictorial Orchid Flora of



the United States and Canada, which is now a part of our website. The NOC website allows viewing of photos made available by many of our members (<http://groups.yahoo.com/group/nativeorchidconference/>; see ‘Related Link’ toward the bottom of this main page) .

But, to complete the Pictorial Orchid Flora we need your help! A file titled ‘Orchid Flora Photos Needed’ is now available on the website (under ‘Files;’) and lists the orchid species not currently represented in the Project. If you have photos of the missing species you are invited to submit them for consideration to be added to the Flora.

*Galearis spectabilis.*

Photo: Ron Coleman

Quality of the submitted photos should be comparable to those in the initial posting of the flora. Credit will be given for all posted photos.

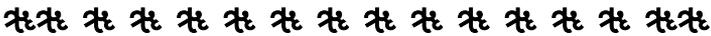
Candidate photos should be submitted in .jpg format on a CD. Image resolution should be roughly 200 dpi, and resulting file size approximately 300 K. If you do not have the capability to create a CD, many photo shops provide this service for a fee. Include an MS Word file, on the CD or as a hard copy, with permission for the Native Orchid Conference to use and post your photos. Put your name on the CD and on the CD jewel. All CDs submitted become the property of the Native Orchid Conference and will not be returned. Acceptance of the CD does not guarantee use of submitted photos as part of the Pictorial Orchid Flora.

The Pictorial Flora editor is solely responsible for decisions on which photos to use. Posted images may be replaced periodically at the discretion of the editor.

The Pictorial Orchid Flora is a big project; it is an exciting project; and it is a unique project. It will be a successful project only with your help.

Please submit candidate photos to:

Ron Coleman, 11520 E. Calle Del Valle, Tucson, AZ 85749.



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- ⇒ New subscribers shall receive all issues published within the year they join Native Orchid Conference.
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