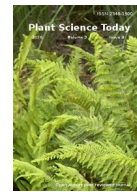




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Research Communication

An updated checklist of Pteridophytes of district Mansehra, Khyber Pukhtunkhwa-Pakistan

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Abstract

Critical examination of the pteridophytes of District Mansehra based on our own field surveys and previous literature as well revealed the occurrence of total 130 taxa distributed in 34 genera and 17 families. Of these, 23 taxa are new records for the study area, while *Polystichum obliquum* (D. Don) T. Moore is reported for the first time for Pakistan. Nomenclatural reassessment of previously reported taxa suggests that 23 taxa are now synonyms. Habitat-wise, 68 taxa are terrestrial, while 54 are epilithic, 5 exist as epiphytes and the remaining 3 are aquatic.

Keywords

District Mansehra; Kashmir; Pakistan; Pteridophytes

Introduction

The floristic studies in Pakistan are still lagging. Most of the work has been done on angiosperms and awfully only sporadic work is available on lower plants especially cryptogams. Consequently, the pteridophyte flora of Pakistan is still somewhat unexplored. This study is an attempt to assess the pteridophytic diversity in Mansehra district. Prior to this attempt, very few workers have performed the diversity analysis in various potential regions of Pakistan especially, Mansehra District. Stewart (1972) was the first person who compiled a detailed checklist of ferns and fern allies for Pakistan and

Kashmir. He reported 133 species, of which, 39 species were also listed from Mansehra district. Later on, a Japanese team became active in 1990-1991 and collected ample material of lower plants from Pakistan. They especially focused the North Western Himalayan region. Their findings were published by Nakaike and Malik (1992, 1993). They provided a comprehensive list of 87 pteridophytes under 18 families and 30 genera. They also showed the occurrence of 62 taxa from District Mansehra. In the same years, Fraser-Jenkins (1991) studied the ferns and allies of the West Himalaya and reported 189 species in Pakistan.

Table 1. Check List of the Pteridophyte Taxa of Mansehra District

Family	Species	Altitude	Distribution in the Area	Habitat	Reference(s)
Aspleniaceae	<i>Asplenium trichomanes x quadrivalencse</i> D.E.Meyer	1070-3200m	Mansehra: Between Shogran and Sari Hut; Sharan Forest, Kund; Sikyan, Near Nadi; Bela, Chanjal, Chattarplan.	Epilithic on rock, cliffs and fissures the edges of forests.	Nakaike, 1993
Aspleniaceae	<i>Asplenium adiantum nigrum</i> L.	900-2743m	Mansehra: Kiwaie; Kamal ban; Poonja, Oghi; Kagan; Siran Vy; Kund, near sharan Forest; Sikian, Near Nadi; Chattarplan; Sikian, near Nadi.	Terrestrail on mountain edges and on mountain slopes.	Nakaike, 1993
Aspleniaceae	<i>Asplenium dalhousiae</i> (Hook.) Ching	670-2300m	Mansehra: Between Shogran and Paprang; Kund, near Sharan Forest; Chanjal, Kot Gallah, Chattarplan.	Epilithic on rock paths of villages.	Nakaike, 1993
Aspleniaceae	<i>Asplenium nesii</i> Christ	1600m	Mansehra: Baffa, Sokar near Eidhgah.	Epilithic on rock groove with rich loam.	New Record
Aspleniaceae	<i>Asplenium pekinense</i> Hance	609-1524m	Mansehra: Damtaur, Munda gucha.	Epilithic on rock, cliffs & fissures the edges of forests.	New Record
Aspleniaceae	<i>Asplenium rutamuraria</i> L.	2200-2500m	Mansehra: Kaghan; Rajwal;Naran.	Epilithic on rock cliffs and fissures on the edges of forests.	New Record
Aspleniaceae	<i>Asplenium septentrionale</i> (L.) Hoffm.	2510-3500m	Mansehra: Between Shogran and Sari Hut.	Epilithic on rock cliffs.	Nakaike, 1993
Aspleniaceae	<i>Asplenium trichomanes</i> L.	1600-3000m	Mansehra: Saiful Maluke lake, Naran; Paya, Sharan Forest; Between Shogran and Paprang, Sharan Forest.	Epilithic on rock, cliffs and fissures the edges of forests.	Nakaike, 1993
Aspleniaceae	<i>Asplenium varians</i> Wallich ex Hook. & Grev.	1970-2480m	Mansehra: Between Shogran and Paprang; Between Shogran and Sari Hut, Sharan Forest; Kund; Sikyan, Near Nadi; Naran ; Rajwal.	Epilithic on rock along mountain paths.	R.R.Stewart, 1972; Nakaike, 1993
Aspleniaceae	<i>Asplenium punjabense</i> Bir, Fraser-Jenk. & Lovis	850-1350m	Mansehra: Kot Gallah, Near Poonja.	Epilithic on rock cliffs and fissures on the edges of forests.	Nakaike, 1993
Aspleniaceae	<i>Asplenium trichomanes- ramosum</i> L.	3100m	Mansehra: Saiful Maluke Lake.	Epilithic on rock along mountain paths.	Nakaike, 1993
Aspleniaceae	<i>Asplenium yunnanense</i> Franch. Syn: <i>Asplenium fontanum</i> L.	2200-2500m	Mansehra: Shogran and Paprang; Kund, near Sharan Forest; Sikyan near Nadi.	Epilithic on rock, cliffs and fissures the edges of forests.	R.R.Stewart, 1972; Nakaike, 1993
Aspleniaceae	<i>Ceterach dalhousiae</i> (Hk.) C.Chr. Syn: <i>Asplenium dalhousiae</i> Hook.	550-3100m	Mansehra: Bela, Chanjal.	Epilithic on rock and paths of villages.	R.R.Stewart, 1972; Nakaike, 1993

Table 1.Contd. Check List of the Pteridophyte Taxa of Mansehra District

Aspleniaceae	<i>Ceterach officinarum</i> Willd. Syn: <i>Asplenium ceterach</i> L.	550-2000m	Mansehra: Baffa; Khabal; Behind Dal Lake, Naran.	Terrestrial on rather mountain village, dry edges paths and tracts.	Nakaike, 1993
Athyriaceae	<i>Allantodia aspera</i> (Blume) Ching Syn: <i>Diplazium polypodioides</i> Blume	1500-2000m	Mansehra: Kaghan; Kotli Bala; Bela; Banda Peran, Dhodial.	Forest ground, canal banks.	R.R.Stewart, 1972
Athyriaceae	<i>Allantodia squamigera</i> (Mett.) Ching Syn. <i>Diplazium squamigerum</i> (Mett.) Hope	1524-2438m	Mansehra: Donari Nallah.	Terrestrial on forest ground.	R.R.Stewart, 1972
Athyriaceae	<i>Athyrium attenuatum</i> (Wall. ex C.B. Clarke) Tagawa	2510-2800m	Mansehra: Between Shogran and Sari; Naran; Lalazar; Siri Paya, Naddi Bagla Forest.	Terrestrial on mountain slopes.	Nakaike, 1993
Athyriaceae	<i>Athyrium mackinnoni</i> (Hope) C. Chr.	1800-2350m	Mansehra: Shogran, Sari Hut; Shogran; Paprang; Sharan Forest; Sikyan, near Nadi.	Terrestrial on mountain slopes and stream moist edges under forest.	R.R.Stewart, 1972; Nakaike, 1993
Athyriaceae	<i>Cystopteris fragilis</i> (L.) Bernh Syn: <i>Cystopteris dickieana</i> R.Sim	1500-3500m	Mansehra: Sharan forest; Kund near Sharan forest; between Shogran and Sari Hut; Shogran and Paprang.	Terrestrial or Epilithic on rocks under big stones near stream water sheds. On mountain and on edges of forests.	Nakaike, 1993
Athyriaceae	<i>Deparia macdonellii</i> Bedd.	2000-2400m	Mansehra: Kamalban Forest	Terrestrial or on mountain slopes and on edges of forests.	Nakaike, 1993
	<i>Peparia gabanica</i> (Thunb.) M.Kato		Mansehra: Jari, Manda chucha		New Record
Athyriaceae	<i>Deparia shikkimensis</i> (Ching) Nakaike et Malik		Mansehra: Saiful Maluke Lake.	Terrestrial on mountain in open places of forests near small streams.	Nakaike, 1993
Athyriaceae	<i>Diplazium frondusum</i> C. Chr.		Mansehra: Sikyan near Nadi; Kamal ban forest.	Terrestrial or on mountain slopes & on edges of forests	R.R.Stewart, 1972; Nakaike, 1993
Blechnaceae	<i>Woodwardia radicans</i> Smith.	1400-1500m	Mansehra: Sikyan near Nadi.	Terrestrial on Banks along rivers.	R.R.Stewart, 1972
Blechnaceae	<i>Woodwardia unigemmata</i> (Makino) Nakai.	1400m	Mansehra: Kiwaie	Terrestrial on Banks along rivers sides forest.	Nakaike, 1993
Dennstaediaceae	<i>Dennstaedtia wilfordii</i> (Moore) Christ	2450-2800m	Mansehra: Sharan forest; Batakundi; Nadi Bangla; Khabbal	Terrestrial on slopes near small steams in forest.	R.R.Stewart, 1972
Dennstaediaceae	<i>Microlepia strigosa</i> (Thunb.) C. Presl	2000m	Mansehra: Sharan Forest; Sikian, near Nadi.	Terrestrial on rather mountain village, dry edges paths and tracts.	R.R.Stewart, 1972; Nakaike, 1993
Dennstaediaceae	<i>Pteridium aquilinum</i> (L.) Kuhn	914-2800m	Mansehra: Shogran and Sari Hut, Paprang, Mansehra Naran, Shran Forest	Forest ground, terrestrial in open places on hill sides on the edges of forest along mountain tracts, and on mountain slopes in forests.	Nakaike, 1993

Table 1.Contd. Check List of the Pteridophyte Taxa of Mansehra District

Dennstaediaceae	<i>Pteridium aquilinum</i> var. <i>latiusculum</i> (Desv.) Underw. ex A. Heller.Syn: <i>Pteridium latiasculum</i> (Desv.) Hieron.	2000- 2800m	Mansehra: Naran; Shogran.	Terrestrial on mountain slopes, forest edges, open places along forests.	New Record
Dryopteridaceae	<i>Cyrtomium</i> <i>caryotideum</i> (Wall. ex Hook. & Grev.) C. Presl.	914- 2133m	Mansehra: Jabori; Behali; Sharan Forest.	Forest ground along stream water shed edges.	New Record
Dryopteridaceae	<i>Cyrtomium falcatum</i> (L. f.) C. Presl.	1400- 1800m	Mansehra: Jabori; Qalandarabad; Behali.	Stream banks, rocky slopes.	New Record
Dryopteridaceae	<i>Cyrtomium</i> <i>macrophyllum</i> (Makino) Tagawa Syn: <i>Cyrtomium</i> <i>muticum</i> (Christ) Ching	1500- 1970m	Mansehra: Sikyan near Nadi.	Terrestrial on banks along stream water shed and forest edges.	R.R.Stewart, 1972
Dryopteridaceae	<i>Dryopteris filix-mas</i> (L.) Schott	3100m	Mansehra: Saiful Maluke Lake, Naran	Terrestrial on mountain slopes in forests.	Nakaike, 1993
Dryopteridaceae	<i>Dryopteris</i> <i>xmacdonelli</i> Fraser- Jenk.	1970m	Hazara: Sikyan near Nadi.	Terrestrial on mountain slopes in mixed forests.	R.R.Stewart, 1972
Dryopteridaceae	<i>Dryopteris barbigera</i> (Moore ex Hook) Kunz subsp. <i>komarovii</i> (Kossinsky) Fraser – Jenk.	3100m	Mansehra: Saiful Maluke Lake, Naran.	Terrestrial on mountain slopes in mixed forests.	Nakaike, 1993
Dryopteridaceae	<i>Dryopteris</i> <i>blanfordii</i> (C. Hope) C. Chr.	1107- 1352m	Mansehra: Kaghan; Shogran, Sari Hut; Sharan Forest; L Lazar, Naran, Siri; Batakundi.	Terrestrial or on mountain slopes & on edges of forests.	Nakaike, 1993
Dryopteridaceae	<i>Dryopteris cochleata</i> (Bach. Ham ex Don) C.Chr.	1100m	Mansehra: Balakot.	Terrestrial on mountain slopes in forests.	R.R.Stewart, 1972
Dryopteridaceae	<i>Dryopteris juxtaposita</i> Christ	2300m	Mansehra: Sharan Forest.	Terrestrial on mountain slopes in mixed forests.	Nakaike, 1993
Dryopteridaceae	<i>Dryopteris</i> <i>nigropaleacea</i> Fraser- Jenk. Syn: <i>Dryopteris spallida</i> Foemin	1400- 2400m	Mansehra: Between Shogran and Sari Hut; Shogran; Paprang, Sharan Forest; Kund near Sharan Forest; Kiwaie; Sikyan, near Nadi; Pagola , Chatarplain.	Terrestrial on mountain edges in mixed forests.	R.R.Stewart, 1972;Nakaike, 1993
Dryopteridaceae	<i>Dryopteris</i> <i>radactopinnata</i> Basu et Panigar.	2300m	Mansehra: Sharan Forest.	Terrestrial on mountain slopes in mixed forests.	Nakaike, 1993
Dryopteridaceae	<i>Dryopteris ramosa</i> (Hope) C.Chr.	1500- 4150m	Between: Shogran and Sari Hut; Shogran; Paprang, Sharan Forest; Kund near Sharan Forest; Sikyan, near Nadi; Pagola , Chatarplain; Lalazar, Naran.	Terrestrial on mountain slopes in mixed forests.	R.R.Stewart, 1972;Nakaike, 1993

Table 1.Contd. Check List of the Pteridophyte Taxa of Mansehra District

Dryopteridaceae	<i>Dryopteris redactopinnata</i> S.K. Basu & Panigrahi	2350-2400m	Mansehra: Sharan Forest.	Terrestrial or on mountain slopes and on edges in mixed forests.	Nakaike, 1993
Dryopteridaceae	<i>Dryopteris serratodentata</i> (Bedd.) Hayata	3048-4876m	Mansehra: Kaghan, Siful Maluke Lake.	Epilithic on rock, crevices cliffs and fissures on rather open places.	Nakaike, 1993
Dryopteridaceae	<i>Dryopteris sinofibrillosa</i> Ching	1524-3352m	Mansehra: Sharan, Kaghan.	Terrestrial on mountain slopes in mixed forests.	Nakaike, 1993
Dryopteridaceae	<i>Dryopteris stewartii</i> Fraser-Jenk.	1100-2500m	Mansehra: Betwwen Shogran and Sari Hut; Shogran; Kewaie; Batakundi, Naran; Paprang, Sharan Forest; Kund near Sharan Forest; Chatarplain; Kamalban.	Terrestrial on mountain slopes in mixed forests.	R.R.Stewart, 1972; Nakaike, 1993
Dryopteridaceae	<i>Dryopteris yigongensis</i> Ching	2350-2400m	Mansehra: Sharan Forest.	Terrestrial on mountain slopes in mixed forests.	Nakaike, 1993
Dryopteridaceae	<i>Dryopteris juxtaposita</i> Christ Syn: <i>Dryopteris odontoloma</i> (Moor) C.Chr.	1524-3048m	Mansehra: Sharan Forest.	Terrestrial on edges in mixed forests.	Nakaike, 1993
Dryopteridaceae	<i>Dryopteris raddeana</i> (Fomin) Fomin Syn: <i>Dryopteris pallida</i> Fomin Moniteur Jard.	2000m	Mansehra: Sharan Forest; Kawai; Poonja.	Terrestrial on mountain slopes in mixed forests.	R.R.Stewart, 1972; Nakaike, 1993
Dryopteridaceae	<i>Dryopteris rosthornii</i> (Diels) C. Chr. Syn: <i>Dryopteris xanthomalas</i> (Christ) C. Chr.	1970-2300m	Mansehra: Sharan Forest; Sikyan, near Nadi.	Terrestrial on mountain slopes in forests.	R.R.Stewart, 1972; Nakaike, 1993
Dryopteridaceae	<i>Hypodematium crenatum</i> (Forssk.) Kuhn	609.60-2133m	Mansehra: Between Balakot and Mansehra.	Epilithic on roks, mountain base and upto 3 meters high.	R.R.Stewart, 1972
Dryopteridaceae	<i>Lastrea ferruginnea</i> Bedd.		Mansehra: Dhodial	Epilithic on rocky paths.	Abbas, 2010
Dryopteridaceae	<i>Polystichum lachenense</i> (Hk.) Bedd.	3657-4876m	Mansehra: Siran Vy.	Terrestrial on mountain slopes in mixed forests.	R.R.Stewart, 1972
Dryopteridaceae	<i>Polystichum discretum</i> (D.don) Diels.	1066-1828m	Mansehra: Lower Siran Vy; Kaghan Vy.	Terrestrial on mountain slopes in mixed forests.	R.R.Stewart, 1972
Dryopteridaceae	<i>Polystichum lonchitis</i> (L.) Roth	2743-3657m	Mansehra: Kagan Vy; Batakundi, Jalkhad, lake Saifulmaluke road, Naran.	Terrestrial and epilithic at the base of rocks, in rather open places under big stones walls.	R.R.Stewart, 1972; Nakaike, 1993
Dryopteridaceae	<i>Polystichum luctuosum</i> (Kunze) Moor syn: <i>Polystichum tsussemens</i>	1400m	Mansehra: Kund near Sharan Forest, Sikyan, near Nadi; Pagola, Chatarplain; Poonja.	Terrestrial on banks on the edges of forests.	R.R.Stewart, 1972; Nakaike, 1993

Table 1.Contd. Check List of the Pteridophyte Taxa of Mansehra District

Dryopteridaceae	<i>Polystichum neolobatum</i> Nakai.	1500-2000 m	Mansehra: Siran Vy.	Terrestrial on mountain slopes in mixed forests.	R.R.Stewart, 1972
Dryopteridaceae	<i>Polystichum nigropaleaceum</i> (Christ) Diels.	1371-3048m	Mansehra: Kwai, Poonja; Sharan Forest.	Terrestrial on mountain slopes, in mixed forests, Sharan forest Mahandri.	New Record
Dryopteridaceae	<i>Polystichum obliquum</i> (D. Don) T. Moore	2400m	Mansehra: Naran, Saiful Maluk lake road. Shogran, Siri Paya road.	Epilithic under rocks big stones.	New Record to Mansehra and Pakistan as well
Dryopteridaceae	<i>Polystichum piceopaleaceum</i> Tagawa.	1500-2350m	Mansehra: Shogran, Sari Hut; Shogran and Paprang; Sharan Forest; Kund near Sharan Forest; Sikyan, near Nadi; Pagola, Kiwai ; Kamal Ban Forest; Chatarplain.	Terrestrial on mountain slopes, in mixed forests.	R.R.Stewart, 1972; Nakaike, 1993
Dryopteridaceae	<i>Polystichum prescotianum</i> (Wall. ex Mett.) T. Moore	2895-3962m	Mansehra: Jabori; Manda Gucha	Terrestrial on mountain slopes, in open places.	New Record
Dryopteridaceae	<i>Polystichum setiferum</i> (Forssk.) Moor ex Woyнар		Mansehra: Siran Vy.	Terrestrial on woodland under thick forest ground.	R.R.Stewart, 1972
Dryopteridaceae	<i>Polystichum squarrusum</i> (D.Don.) Fee.	1828-2743m	Mansehra: Kaghan	Terrestrial on mountain slopes, under mixed forests.	R.R.Stewart, 1972
Dryopteridaceae	<i>Polystichum thomsonii</i> (Hk.f.) Bedd.	1981-3810m	Mansehra: Between Shogran and Sari hut; Sikyan near Nadi; Munda gucha; Siri.	Epilithic on wet rocks Near waterfalls, streams.	R.R.Stewart, 1972; Nakaike, 1993
Dryopteridaceae	<i>Polystichum wilsonii</i> Christ	3100m	Mansehra: Saiful Maluke Lake, Naran	Epilithic on rocks on rock crevices in rather open places.	Nakaike, 1993
Dryopteridaceae	<i>Polystichum yunnanense</i> Christ	1500-2500m	Mansehra: Jabori; Munda Gucha	Terrestrial on woodland under thick forest ground.	New Record
Dryopteridaceae	<i>Polystichum bakerianum</i> (Atk. ex C.B. Clarke) Dielssyn: <i>P. prescotianum</i> var. <i>bakerianum</i> Wall. ex Moor.	3048-3657m	Mansehra: Sharan Forest	Terrestrial on mountain slopes, in open places.	Nakaike, 1993
Equisetaceae	<i>Equisetum arvense</i> L.	1371-3657m	Mansehra: Kund near Sharan Forest; Naran, Kaghan; Kamalban Forest.	Terrestrial on dry river beds.	R.R.Stewart, 1972; Nakaike, 1993
Equisetaceae	<i>Equisetum ramosissimum</i> Desf.	460-3657m	Mansehra: Pagola, Kawai	Terrestrial on mountain slopes, stream banks.	R.R.Stewart, 1972; Nakaike, 1993
Equisetaceae	<i>Hippochaete debilis</i> (Roxb. ex Vaucher) Ching Syn: <i>Equisetum debile</i> Roxb. ex Vaucher	1500-2000m	Mansehra: Oghi	Along Ephemeral canals.	New Record

Table 1.Contd. Check List of the Pteridophyte Taxa of Mansehra District

<i>Lomariopsidaceae</i>	<i>Nephrolepis auriculata</i> (L.) Triamen	2000m	Mansehra	Potted (ornamental).	New Record
<i>Lomariopsidaceae</i>	<i>Nephrolepis biserrata</i> (Sw.) Schott	1200m	Mansehra	Potted(ornamental).	New Record
<i>Lomariopsidaceae</i>	<i>Nephrolepis cordifolia</i> (L.) Presl	1000-1500m	Mansehra	Potted(ornamental).	New Record
<i>Lomariopsidaceae</i>	<i>Nephrolepis exaltata</i> (L.) Schott	1000-1200m	Mansehra	Potted(ornamental).	New Record
<i>Lygodiaceae</i>	<i>Lygodium scandense</i> (L.) Sw.	1524m	Mansehra: Baffa, along canal banks climbing on <i>Populus</i> trees	Terrestrial along canal banks, on broad leaves trees.	New Record
<i>Lygodiaceae</i>	<i>Lygodium japonica</i> (Thunb.) Sw.	1066m	Mansehra: Baffa; Shinkiari.	Terrestrial on mountain under <i>Rosa</i> , <i>Berberis</i> .	New Record
Marsiliaceae	<i>Marsilea minuta</i> L.	660-1550m	Mansehra: Chhattarplan; Kotli Bala.	Canals banks.	R.R.Stewart, 1972
Marsiliaceae	<i>Marsilea quadrifolia</i> L.		Mansehra: Makra base, Shogran Siri Paya.	In Ponds.	New Record
<i>Ophioglossaceae</i>	<i>Botrychium lunaria</i> (L.) Sw. Syn: <i>Botrychium lunaria</i> var. <i>minganense</i> (Vict.) Dole	305-3962m 2194m	Mansehra: Kaghan.	Terrestrial on mountain slopes, in mixed forests.	R.R.Stewart, 1972
<i>Ophioglossaceae</i>	<i>Botrychium virginianum</i> (L.) Sw. Syn: <i>Botrypus virginianus</i> (L.) Holb.	727-2194m	Mansehra: Kaghan; Shogran.	Terrestrial on mountain slopes, in mixed forests.	R.R.Stewart, 1972; Nakaike, 1993
Polypodiaceae	<i>Lepisorus clathratus</i> (C.B. Clarke) Syn: <i>Pleopiltis clathrata</i> (Clarke) Bedd.	2438-3657m	Mansehra:Kagan	Epilithic on rocks in rather open places.	Nakaike, 1993
Polypodiaceae	<i>Lepisorus nudus</i> (Hook.) Ching Syn: <i>Pleopiltis nuda</i> Hook.	1524m	Mansehra: Durra Nullah; Kaghan Nakial near Kotli,	Epiphyte.	R.R.Stewart, 1972
Psilotaceae	<i>Psilotum nudum</i> (Linnaeus) Palisot de Beauvois		Mansehra: Above Chittarplain.	Terrestrial under stones base mountain.	New Record
Pteridaceae	<i>Adiantum cappiluveneris</i> L.	3810-250m	Mansehra: Changan, Kot Gala.	Terrestrial on slopes paths under Chir Pine Forests.	Nakaike, 1993
Pteridaceae	<i>Adiantum incism</i> Forssk.	1524-550m	Mansehra: Changan; Balakot.	Terrestrial on slopes, paths, near water channels.	R.R.Stewart, 1972; Nakaike, 1993
Pteridaceae	<i>Adiantum venustum</i> D.Don	3657m	Mansehra: Shogran; Paprang, Sharan Forest, Kund. Kund near Sharan Forest; Naran; Kaghan; Kamalban Forest; Kiwai; Siran Vy.	Terrestrial on slopes, paths under Chir Pine forests.	R.R.Stewart, 1972; Nakaike, 1993

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Pteridaceae	<i>Adiatum pedatum</i> L.	1828-3048m	Mansehra: Sharan Forest, Sharan; Kaghan.	Found under thick Blue Chir pine forests on ground and edges.	Nakaike, 1993
Pteridaceae	<i>Cheilanthes albomarginata</i> C.B.Clarke	1219-2443m	Mansehra: Balakot; Jabori ; Munda Gucha.	Epilithic on rocks along mountain paths.	New Record
Pteridaceae	<i>Cheilanthes pteridioides</i> (Reich.) C. Chr.		Mansehra: Dhodial.	Epilithic on rocks along mountain paths	Abbas, 2010
Pteridaceae	<i>Chelianthes acrostica</i> (Bulbis) Todaro	480-710m	Mansehra: Chanjal.	Epilithic on rocks along mountain paths.	R.R.Stewart, 1972
Pteridaceae	<i>Chelianthes ancepes</i> Blanford Syn: <i>Chelianthes farinosa</i> Kaulf.	650-1170m	Mansehra: Between Balakot and Mansehra.	Epilithic on rocks along mountain paths.	R.R.Stewart, 1972
Pteridaceae	<i>Chelianthes dalhousiae</i> Hook.	2133-3657m	Mansehra: Between Shogran and Sari Hut.	Epilithic on rocks along mountain paths.	Nakaike, 1993
Pteridaceae	<i>Chelianthes formosana</i> Hayata in Matsum. et Hayata	1170-1355m	Mansehra: Between Balakot and Mansehra city.	Epilithic on rocks along mountain paths.	R.R.Stewart, 1972
Pteridaceae	<i>Chelianthes grisea</i> Blanf.		Mansehra	Epilithic on rocks along mountain paths.	R.R.Stewart, 1972
Pteridaceae	<i>Chelianthes subvillosa</i> Hook.	1524-2743m	Mansehra: Siran Vy.	Epilithic on rocks along dry mountain paths.	R.R.Stewart, 1972
Pteridaceae	<i>Coniogramme affinis</i> Wall.ex Hieron.	5331-1970m	Mansehra: Sikian, near Nadi.	Terrestrial or .on mountain slopes & on edges of forests.	R.R.Stewart, 1972
Pteridaceae	<i>Cyptogramma stelleri</i> (Gmel.) Prantl	2500-3100m	Mansehra: Siful Maluke Lake, Naran.	Epilithic on rocks under big stones near stream water sheds.	Nakaike, 1993
Pteridaceae	<i>Diplazium esculentum</i> (Retz.) Sw.	1060m	Mansehra: Pagola, Mansehra.	Terrestrial on forest ground.	R.R.Stewart, 1972
Pteridaceae	<i>Mildella nitidula</i> (Wall. ex Hook.) Hall	1500m	Mansehra: Sharan Forest.	Epilithic on rocks along village paths and terrestrial on banks of brooks.	Nakaike, 1993
Pteridaceae	<i>Onichium contagium</i> (Wall.) Hope (Unres)	1828-2743m 1500m	Mansehra: Between Shogran and Sari Hut; Shogran and Paprang; Sharan Forest, Kund.	Mountain path moist edges and under shrubs.	Nakaike, 1993
Pteridaceae	<i>Onichium japonicum</i> (Thunb.) G.Kunz.	1060-1828m	Mansehra: Pagola	Mountain path moist edges and under shrubs.	R.R.Stewart, 1972
Pteridaceae	<i>Pellae nitidula</i> Wall.ex Baker	914-2743m	Mansehra: Shinkiari.	Epilithic on rocks, mountain moist path edges.	R.R.Stewart, 1972
Pteridaceae	<i>Pellaea calomelanos</i> (SW.) Link Syn: <i>Pellae hastatea</i> (Thunb.) Prantl	1371m	Mansehra: Baffa.	Epilithic on rocks, mountain path dry edges.	New Record

Table 1.Contd. Check List of the Pteridophyte Taxa of Mansehra District

Pteridaceae	<i>Pteris cretica</i> L.	660-2438m	Mansehra: Shogran and Paprang; Kund, Sharan; Sikyan, near Nadi; Mahandry, Poonja.	Along water channels.	R.R.Stewart, 1972; Nakaike, 1993
Pteridaceae	<i>Pteris excelsa</i> Gaud.	2000-2500m	Mansehra: Chamba eastward, Siran Vy.	Stream moist edges under forest.	R.R.Stewart, 1972
Pteridaceae	<i>Pteris quadrialata</i> Willd.	2000-2500m	Mansehra: Munda Gucha.	Stream moist edges under forest	New Record
Pteridaceae	<i>Pteris stenophylla</i> Wall. ex Hook. & Grev.	1200-2000m	Mansehra: Siran valley.	Terrestrial canals sides, near water shed of streams.	New Record
Pteridaceae	<i>Pteris vittata</i> L. Syn: <i>Pteris longifolia</i> L.	Below 1524-1060m	Mansehra: Chanjal, Sharan Forest; Pagola.	Canals sides.	R.R.Stewart, 1972; Nakaike, 1993
Pteridaceae	<i>Adiantum myriosorum</i> Bak.	2447m	Mansehra: Sharan Forest.	Found under thick Blue, Chir Pine forests on ground and edges.	R.R.Stewart, 1972; Nakaike, 1993
Salviniaceae	<i>Azolla pinnata</i> R.Br.	460m	Mansehra: Jabori	Rice paddies.	New Record
Selaginellaceae	<i>Selaginella jaquomontii</i> L.	550-3500m	Mansehra: Ogawain, Kund near Sharan Forest; Kamalban forest.	Epilithic on rocks under dense forest or village paths	R.R.Stewart, 1972
Selaginellaceae	<i>Selaginella sanguinolenta</i> (L.) Spring Syns: <i>Selaginella sanguinolenta</i> Liebm. ex Fourn. <i>Selaginella sanguinolenta</i> f. <i>aitchisonii</i> (Hieron.) Alston <i>Selaginella</i> f. <i>indica</i> (Milde) Alston	1188-5943m	Mansehra: Jabori; Munda Gucha; Balakot.	Epilithic on rocks.	R.R.Stewart, 1972; Nakaike, 1993
Selaginellaceae	<i>Selaginella chrysocaulos</i> (Hook. & Grev.) Spring	1828m-2370 m	Mansehra: Jabori; Munda Gucha; Balakot	Epilithic on rocks and mountain tracts and on mountain slopes in forests.	R.R.Stewart, 1972; Nakaike, 1993
Thelypteridaceae	<i>Ampelopteris prolifera</i> (Retz.) Copel. Syn: <i>Thelypteris prolifera</i> Voster	600-1100m	Mansehra: Shinkiari; Batal; Kotli.	Terrestrial along canal banks.	R.R.Stewart, 1972; Nakaike, 1993
Thelypteridaceae	<i>Christella dentata</i> (Forssk.) Syn: <i>Thelypteris dentata</i> (Forssk.) E.P. St. John	1219.20 m	Mansehra: Siran Vy and Garhi Habibullah.	Epilithic on rocks.	New Record
Thelypteridaceae	<i>Cyclosorus subpubescens</i> (Blume) Ching Syn: <i>Thelypteris subpubescens</i> (Blume) K. Iwats	2500-4000m	Mansehra: Siran Range; Babusar Pass; Batakundi; Behsil, Naran.	Epilithic on rocks base.	R.R.Stewart, 1972

Table 1.Contd. Check List of the Pteridophyte Taxa of Mansehra District

Thelypteridaceae	<i>Gymnocarpium robertianum</i> (Hoffm.) Newman	2000-2800m	Mansehra: Between Shogran and Sari Hut; Shogran and Paprang; Kund, Sharan Forest; Sharan Forest, Sikian, near Nadi.	Epilithic on mountain bases, slopes, Terrestrial or con mountain slopes & on edges of forests, at base of rocks also.	Nakaike, 1993
Thelypteridaceae	<i>Gymnocarpium remote pinnatum</i> (Hayata) Ching Syn: <i>Thelypteris remotipinnata</i> (Bonap.) Alston	1524-3352m	Mansehra: Batakundi and Bihsil, Naran	Epilithic on rocks slopes edges	New Record
Thelypteridaceae	<i>Thelypteris erubescence</i> (Wall. ex Hook.) Ching	914.-1828m	Mansehra: Siran Vy.	Epilithic on rocks, edges, near streams.	R.R.Stewart, 1972
Thelypteridaceae	<i>Thelypteris levingei</i> (Bak) Ching	1219-2438m	Mansehra: Kaghan and Siran Vy.	Terrestrial on slopes near small streams in forest.	R.R.Stewart, 1972
Thelypteridaceae	<i>Thelypteris palustris</i> Schott	1524-2133m	Mansehra: Kaghan	Epilithic on rocks, Paths, near streams	R.R.Stewart, 1972
Thelypteridaceae	<i>Thelypteris laterpens</i> R.R.Stewart in Nasir & Ali	2000-2500m	Mansehra: Siran and Kaghan.	Epilithic on rocks, Paths, near streams.	Nakaike, 1993
Thlyptridaceae	<i>Phegopteris onnectilis</i> (Michx) Watt	3100m	Mansehra: Saiful Maluke road, Naran.	Forest ground, terrestrial in open places on hill sides on the edges of forest along mountain tracts and on mountain slopes in forests.	Nakaike, 1993
Thlyptridaceae	<i>Pseudophegopteris levingie</i> (Clarke) Ching	2000-2800m	Mansehra: Between Shogran and Sari Hut; Shogran and Paprang; Kund, Sharan Forest, ;Paya;Kamalban; Batakundi, Naran.	Terrestrial on the edges of forests and on mountain slopes along streams.	Nakaike, 1993
Thlyptridaceae	<i>Pseudophegopteris levingie x pyrhorachis</i> Nakaike	2300-2700m	Mansehra: Sharan Forest.	Terrestrial on the edges of forests and on mountain slopes along streams.	Nakaike, 1993
Thlyptridaceae	<i>Pseudophegopteris pyrhorachis</i> (Kunz) Ching	2000-2300m	Mansehra: Shogran and Sari Hut; Shogran and Paprang; Kund, Sharan Forest.	Terrestrial on the edges of forests and on mountain slopes along streams.	Nakaike, 1993
Woodsiaceae	<i>Deparia allantodiodes</i> (Bedd.) M.Katto.	2400-2700m	Mansehra: Between Shogran and Sari Hut; Shogran and Paprang; Sharan Forest; Sikyan near Nadi.	Terrestrial on mountain slopes in forests	R.R.Stewart, 1972; Nakaike, 1993
Woodsiaceae	<i>Deparia macdonellii</i> (Bedd.) M.Katto.	2000-2100m	Mansehra: Sikyan near Nadi.	Terrestrial on banks along mountain tracts near streams shads.	R.R.Stewart, 1972; Nakaike, 1993
Woodsiaceae	<i>Deparia shikkimensis</i> (Ching) Nakaike et Malik	2300-3100m	Mansehra: Sharan forest; Saiful Maluke Lake.	Terrestrial on mountain slopes in forests in open places and banks along forest tracts near streams sheds.	Nakaike, 1993

Later on, he further added 52 taxa (Fraser-Jankins, 2014). Therefore on the basis of earlier contributions overall 110 taxa have been reported from Mansehra District. In current study an attempt has been made to find out the present status of the pteridophytic diversity in Mansehra District based on previous efforts and current extensive field investigations during 2012-2015. The result has been presented in the form a checklist.

Materials and Methods

1. Study Area

Mansehra is situated between 34°-14' to 35°-11' N and, 72° 49' to 74° -08' E in the Khyber Pakhtunkhwa province, Pakistan with an about 4, 579 sq. km. The altitude varies from 400 m in the foot-hill regions to more than 4000 m high with thick snow covered peaks of Malaika Parbath. The District comprises of three tehsils: Balakot, Mansehra, Oghi (Anonymous, 1998). The district Manshera falls under Sino-Japanese Phytogeographical region of Pakistan. This zone is known as one of the botanically richest zones of the world (Ali and Qaiser, 1986).

2. Experimental Design

Initially, a meticulous literature survey was carried out to obtain a comprehensive list of the taxa. In addition, many field trips were also made in various localities of the area in different seasons during 2013-15. In each trip, ferns were collected with suitable data. Collected specimens were properly mounted and identified with the help of various relevant flora. Smith's classification (2006) was used for ferns in order to follow different taxonomic ranks. Lycophytes were treated according to Christenhusz *et al.* (2011) proposed scheme. Current accepted nomenclature was confirmed through "The plant list" database (www.theplantlist.com).

Results and Discussion

Details about nomenclature, altitude, distribution and habitat have been provided in the Table 1. A critical examination reveals 134 taxa distributed in 34 genera and 17 families to the area. This figure meets about 53.6% of the total known taxa for Pakistan (i.e. 250 taxa). Dryopteridaceae is the largest family with 8 genera and 45 species, followed by Pteridaceae (8 genera, 25 species) and Thelypteridaceae (6 genera and 9 species). In the remaining families, less than 8 species for each family. For genera, *Dryopteris* is the largest genus with 17 species. *Polystichum* and *Asplenium* come to next with 16 and 14 species respectively. total taxa, 23 are new records for Mansehra District viz., *Asplenium nesii* H. Christ, *Asplenium pekinense* Hance, *Asplenium ruta-muraria* L., *Cyrtomium caryotideum* (Wall. ex Hook. & Grev.) C. Presl, *Cyrtomium falcatum* (L. f.) C. Presl, *Polystichum*

nigropaleaceum (Christ) Diels., *Polystichum prescotianum* (Wall. ex Mett.) T. Moore, *Hippochaete debilis* (Roxb. ex Vaucher) Ching, *Lygodium scandense*(L.) Sw. *Lygodium japonicum* (Thunb.) Sw., *Ampelopteris prolifera* (Retz.) Copel., *Cheilanthes albomarginata* C.B. Clarke, *Deparia japonica* (Thunb.) M. Kato, *Pellaea calomelanos* (Sw.) Link, *Pteridium aquilinum* var. *latiusculum* (Desv.) Underw. ex A. Heller., *Pteris quadrialata* Willd. *Pteris stenophylla*, *Nephrolepis auriculata*(L.) Triamen, *Nephrolepis biserrata*(Sw.) Schott, *Nephrolepis cordifolia* (L.) Presland, *Nephrolepis exaltata* (L.) Schott. Among new records, *Polystichum obliquum* (D. Don) T. Moore, member of Dryopteridaceae, is reported for the first time to Pakistan as well. Nomenclatural reassessment also suggests that names of previously reported 23 taxa are now synonyms and current accepted names are provided in the check list (Table 1).

Habitat-wise, 70 taxa are terrestrial on forest edges, ground, open places, village paths and mountain tracts, while 54 taxa are epilithic on rocks fissures, crevecis, 7 rare taxa epiphytes on trees in thick forests of pines and 3 other were aquatic in fresh waters and rice paddies only (Table 1).

References

- Abbas, K. 2010. Palenological Characterization of Certain Ferns of Hazara Division Western Hiamalaya-Pakistan. M.Sc. Thesis (un published). Department of Botany, Hazra University-Pakistan.
- Ali, S.I. & M. Qaiser 1986. A phytogeographical analysis of phanerogams of Pakistan and Kashmir. *Proc. Roy. Soc. Edinb.*, 89 B: 89-101.
- Anonymous. 1998. District census report of Mansehra.
- Christenhusz M. J. M, Zhang X-C, Schneider H. 2011. A linear sequence of extant lycophytes and ferns. *Phytotaxa* 19: 7-54.
- Fraser-Jenkins C.R. 1992. The Ferns and allies of the West Himalaya: some additions and corrections; <http://dx.doi.org.110.5169/seals-70937>
- Fraser-Jenkins, C.R. 2014. Ferns and Allies of the far-west Indo-Himalaya (Afghanistan, Pakistan and Kashmir) and Iran-revised checklists, classification and phytogeography, *Indian Fern J.* 30(1-2): 161-191.
- Nakaike, T. & S. Malik. 1992. A list of Pteridophytes collected from Pakistan in 1990. Cryptogamic flora of Pakistan. *National Science Museum, Tokyo* 1: 261-316.
- Nakaike, T. and S. Malik. 1993. A List of Pteridophytes collected from Pakistan in 1991. In: Nakaike, T. and S. Malik 1993 (eds.). *Crypt. Fl. of Pak.* 1993. II: 317-359.
- Smith, A.R., Pryer, K.M., Schuettpelz, E., Korall, P., Schneider, H. & Wolf, P.G. 2006. A classification of extant ferns. *Taxon* 55: 705-731.
- Stewart, R.R. 1972. *An Annotated Catalogue of the Vascular Plants of West Pakistan and Kashmir.* In: *Fl. of West Pak.* pp: xv-xvii, 1-24.