

A PROVISIONAL CHECKLIST OF TURKISH PTERIDOPHYTA

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ABSTRACT. A checklist of Turkish pteridophytes giving distribution in four phytogeographical regions (Turkey in Europe, North Anatolia, Inner Anatolia and Mediterranean Turkey) is presented. It is based on both published and new records, and the latter are listed in Appendix 1. *Asplenium septentrionale* subsp. *caucasicum* Fraser-Jenkins & Lovis, subsp. nov., is described in Appendix 2.

The most recent complete account of the taxonomy and distribution of the Turkish pteridophytes is that in the *Flora of Turkey* (ed. P. H. Davis), Vol. 1, pages 31-63, published in 1965, which is based upon earlier published records as well as the examination of a large amount of herbarium material. Since 1965 many changes to the names used in the original account have appeared in the literature. In addition many more collections have been made and some older collections have been re-examined and redetermined as species not previously recorded in Turkey. The time is therefore ripe to provide an up-to-date checklist.

In the list below occurrence is recorded in four major phytogeographical regions of Turkey: Turkey in Europe, North Anatolia, Inner Anatolia and Mediterranean Turkey. These regions are shown in Fig. 1; the first three are as delimited in the Introduction of *Flora of Turkey* Vol. 1, while the last includes South and West Anatolia and the East Aegean Islands of the *Flora of Turkey*, which we believe to be a natural phytogeographical region for pteridophytes. The plant names are in accord with recent treatments in neighbouring Floras.

Some species included in the *Flora of Turkey* are omitted from the present list. *Equisetum sylvaticum* L. and *Dryopteris cristata* (L.) A. Gray were included solely on the basis of Sibthorp's records. Examination of his herbarium at Oxford (in OXF) and of the other collections there which would have been available to him has failed to disclose any Turkish material of *E. sylvaticum*. Material labelled '*Aspidium cristatum*' from Turkey in Sibthorp's herbarium was, predictably, *Dryopteris carthusiana*; this was the common application of the epithet *cristatum* at the time that Sibthorp was working. The collection cited as *Cystopteris montana* (Lam.) Desv. in *Flora of Turkey* has been examined and is actually *C. regia* (L.) Desv. *Lycopodium annotinum* L. and *Marsilea quadrifolia* L. were only included because of Grossheim's map records (Grossheim, 1939). It seems inadvisable to retain these species in the Turkish flora while they are unsupported by herbarium material as there is doubt about the provenance of some of his records. *Selaginella denticulata* (L.) Link was doubtfully cited by Webb (1966) from Turkey in Europe; this record was based upon Hermann's

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FIG. 1. Major phytogeographical regions of Turkey.

(1936) report of it at Çilingöz. No voucher specimen has been traced in Hermann's collections at Gatersleben (P. Hanelt in litt.). *Polystichum aculeatum* (L.) Roth may perhaps occur in Turkey in Europe but we know of no authentic material (see Webb (1966) regarding possible misidentifications of this species). *Selaginella helvetica* (L.) Spring has been doubtfully recorded for Turkey in Europe by Lawalrée (1964) but we have seen no Turkish material.

FUTURE ADDITIONS

The list presented below does not claim to be definitive and doubtless more taxa will be recorded in the future. Several in neighbouring countries may reasonably be expected to occur in Turkey, including *Asplenium ceterach* subsp. *bivalens* (D. E. Meyer) ined. (syn. *Asplenium javorkeanum* Vida; *Ceterach officinarum* subsp. *bivalens* D. E. Meyer), *A. creticum* Lovis, Reichstein & Zaffran, *A. ruta-muraria* subsp. *dolomiticum* Lovis & Reichstein, *A. trichomanes* subsp. *inexpectans* Lovis, and *Dryopteris affinis* subsp. *affinis* var. *disjuncta* (Fomin) Fraser-Jenkins*.

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We are grateful to Professor T. Reichstein for much useful discussion, especially on the taxonomy and nomenclature of various groups and the distribution of *Asplenium* taxa. The idea of a checklist originated with Professor P. H. Davis as part of the OPTIMA Mediterranean checklist project and he has given the subsequent modification and publication every encouragement. Dr P. Hanelt very kindly helped us by searching for the Hermann specimen of *Selaginella denticulata* in the Gatersleben herbarium. The map of Turkey in Fig. 1 was drawn by Mrs Sylvia Dalton.

* Since this paper went to press, a specimen of *D. affinis* subsp. *affinis* var. *disjuncta* collected in Rize by Balansa has been discovered in P.

CHECKLIST OF TURKISH PTERIDOPHYTA

- + without other annotation: presence based on specimens cited in *Flora of Turkey*.
 + with annotation: presence based upon new records (in appendix 1) or specimens already cited in references given in code.
 — not recorded.

Code: a, Baytop & Özocak 1970; b, Demiriz & Kaynak 1977; c, Fraser-Jenkins 1974; d, Demiriz et al. 1969; e, Shivas 1961; f, Crabbe et al. 1964; g, Demiriz et al. 1977; h, Webb 1966; i, Fraser-Jenkins 1976; k, Tanker & Coşkun 1978; l, Fraser-Jenkins 1979; m, Demiriz et al. in prep.; n, new record (in appendix); o, the record in Tanker & Coşkun 1978 is *D. filix-mas*; p, Fraser-Jenkins 1977; q, Sibthorp coll. cited as *D. cristata* in *Flora of Turkey*; r, Page 1979; s, Reichstein & Vida 1973; t, Reichstein et al. 1973; u, Fraser-Jenkins 1980.

	Turkey in Europe	North Anatolia	Inner Anatolia	Mediterranean Turkey
Lycopodiaceae				
<i>Lycopodium alpinum</i> L. (<i>Diphasiastrum alpinum</i> (L.) Holub)	—	+	—	—
<i>L. clavatum</i> L.	—	+	—	—
<i>L. complanatum</i> L. subsp. <i>chamaecyparissus</i> (A. Br.) Döll	—	+	—	—
<i>L. selago</i> L. (<i>Huperzia selago</i> (L.) Bernh. ex Schränk. & Mart.)	—	+	—	—
Selaginellaceae				
<i>Selaginella denticulata</i> (L.) Link	—	—	—	+
Isoetaceae				
<i>Isoetes olympica</i> A. Br.	—	+	—	—
<i>I. histrix</i> Bory var. <i>histrix</i>	—	—	—	+
var. <i>subinermis</i> Durieu	—	—	+	+
<i>I. durieui</i> Bory	—	+	—	—
Equisetaceae				
<i>Equisetum hyemale</i> L.	+	+	—	—
<i>E. ramosissimum</i> Desf.	+	+	+	+
<i>E. variegatum</i> [Schleicher ex] Weber & Mohr	—	+ ^r	—	—
<i>E. fluviatile</i> L.	—	+	—	+
<i>E. arvense</i> L.	+	+	+	—
<i>E. palustre</i> L.	+	+	—	+ ^a
<i>E. telmateia</i> Ehrh.	+	+	—	+
Ophioglossaceae				
<i>Botrychium lunaria</i> (L.) Sw.	—	+	+	—
<i>Ophioglossum vulgatum</i> L.	—	+	+	+
<i>O. lusitanicum</i> L.	+	+	—	+
Osmundaceae				
<i>Osmunda regalis</i> L.	+	+	—	+
Adiantaceae				
<i>Cryptogramma crispa</i> (L.) R.Br. ex Hooker	—	+	—	—
<i>Cheilanthes pteridioides</i> (Reich.) C.Chr. (<i>C. fragrans</i> (L. fil.) Swartz)	—	+	+ ^b	+
<i>C. duriensis</i> Mendonça & Vasc. (<i>C. corsica</i> Reichst. & Vida)	—	+ ^s	—	—
<i>C. persica</i> (Bory) Mett. ex Kuhn	—	+	+	+

	Turkey in Europe	North Anatolia	Inner Anatolia	Mediterranean Turkey
<i>C. marantae</i> (L.) Domin subsp. <i>marantae</i> (<i>Notholaena marantae</i> (L.) Desv. subsp. <i>marantae</i>)	—	+	+	+
<i>C. vellea</i> (Aiton) F. v. Mueller (<i>C. catanensis</i> (Cos.) Fuchs; <i>Notholaena</i> <i>lanuginosa</i> (Desf.) Desv. ex Poiret)	—	—	—	+
<i>Anogramma leptophylla</i> (L.) Link	—	+	+ ^b	+
<i>Adiantum capillus-veneris</i> L.	+	+	+	+
<i>Pteris vittata</i> L.	—	—	—	+
<i>P. dentata</i> Forsk. subsp. <i>dentata</i>	—	—	—	+
<i>P. cretica</i> L.	—	+	—	—
Hymenophyllaceae				
<i>Hymenophyllum tunbrigense</i> (L.) Sm.	—	+ ^c	—	—
Polypodiaceae				
<i>Polypodium vulgare</i> L. (<i>P. vulgare</i> L. subsp. <i>vulgare</i>)	+ ^d	+	—	+ ^d
<i>P. interjectum</i> Shivas (<i>P. vulgare</i> subsp. <i>prionodes</i> (Ascherson) Rothm.)	+ ^{a,d}	+	—	+
<i>P. x mantoniae</i> Rothm. (<i>P. vulgare</i> x <i>interjectum</i>)	—	+ ⁿ	—	—
<i>P. cambricum</i> L. (<i>P. australe</i> Fée)	+ ^d	+ ⁿ	—	+
<i>P. x shivasiae</i> Rothm. (<i>P. cambricum</i> x <i>interjectum</i>)	+ ^{?e}	+ ^{?e}	—	—
Dennstaedtiaceae				
<i>Pteridium aquilinum</i> (L.) Kuhn (<i>P. lanuginosum</i> (Bory ex Willd.) Clute)	+	+	—	+
Thelypteridaceae				
<i>Thelypteris thelypteroides</i> Michx subsp. <i>glabra</i> Holub (<i>T. palustris</i> Schott; <i>Dryopteris</i> <i>thelypteris</i> (L.) A. Gray)	+ ^{a,d}	+	—	—
<i>Phegopteris connectilis</i> (Michx) Watt (<i>Thelypteris phegopteris</i> (L.) Slosson)	—	+	—	—
<i>Lastrea limbosperma</i> (All.) Holub & Pouzar (<i>Thelypteris limbosperma</i> (All.) Fuchs; <i>Oreopteris limbosperma</i> (All.) Holub)	—	+	—	—
Aspleniaceae				
<i>Asplenium trichomanes</i> L. sens. lat. subsp. <i>trichomanes</i>	+	+	+	+
subsp. <i>quadrivalens</i> D. E. Meyer	—	+ ⁿ	—	—
<i>A. viride</i> Hudson	+ ⁿ	+ ⁿ	—	+ ⁿ
<i>A. bourgaei</i> Milde	—	+	+	—
<i>A. sp.</i> , nr <i>A. creticum</i> Lovis, Reichstein & Zaffran	—	—	—	+
<i>A. adiantum-nigrum</i> L. (<i>A. nigrum</i> Lam.)	—	—	—	+ ⁿ
<i>A. adiantum-nigrum</i> L.	+	+	—	+
<i>A. onopteris</i> L.	—	+	—	+
<i>A. onopteris</i> x <i>adiantum-nigrum</i>	—	+ ⁿ	—	—
<i>A. cuneifolium</i> Viv.	—	—	—	+
<i>A. adiantum-nigrum</i> x <i>woronowii</i>	—	+ ⁿ	—	—
<i>A. woronowii</i> Christ	—	+ ^m	—	—
<i>A. obovatum</i> Viv.	+ ^f	+	—	+

	Turkey in Europe	North Anatolia	Inner Anatolia	Mediterranean Turkey
<i>A. septentrionale</i> (L.) Hoffm.				
subsp. <i>septentrionale</i>	+	+ ⁿ	+ ^g	—
subsp. <i>caucasicum</i> Fraser-Jenkins & Lovis (description, p. 281)	—	+ ⁿ	—	—
<i>A. x alternifolium</i> Wulf.	+	—	—	—
(<i>A. septentrionale</i> subsp. <i>septentrionale</i> x <i>trichomanes</i> subsp. <i>trichomanes</i>)				
<i>A. x heuffleri</i> Reich. (diploid)	—	+ ⁿ	—	—
<i>A. ruta-muraria</i> L. subsp. <i>ruta-muraria</i>	+	+	+	+
<i>A. lepidum</i> C. Presl subsp. <i>haussknechtii</i> (Godot & Reuter) Brownsey (<i>A. haussknechtii</i> Godot & Reuter)	—	—	+	+
<i>A. x reuteri</i> Milde	—	—	—	+
(<i>A. lepidum</i> subsp. <i>haussknechtii</i> x <i>trichomanes</i> subsp. <i>quadrivalens</i>)				
<i>A. aegaeum</i> Lovis, Reichst. & Greuter	—	—	—	+ ⁱ
<i>A. scolopendrium</i> L. subsp. <i>scolopendrium</i> (<i>Phyllitis scolopendrium</i> (L.) Newman)	+	+	+	+
<i>A. sagittatum</i> (DC.) A. J. Bange (<i>Phyllitis sagittata</i> (DC.) Guinea & Heywood)	—	—	—	+
<i>A. ceterach</i> L. subsp. <i>ceterach</i> (<i>Ceterach officinarum</i> DC. subsp. <i>officinarum</i>)	+	+	+ ^{b,d}	+
subsp. <i>ceterach x bivalens</i> (D. E. Meyer) ined.	—	—	—	+ ⁿ
Athyriaceae				
<i>Matteucia struthiopteris</i> (L.) Tod.	—	+	—	—
<i>Athyrium filix-femina</i> (L.) Roth	+	+ ^{a,d}	—	+
<i>A. distentifolium</i> [Tausch ex] Opiz	—	+	—	—
<i>Gymnocarpium dryopteris</i> (L.) Newman (<i>Thelypteris dryopteris</i> (L.) Slosson)	—	+	+	—
<i>Cystopteris fragilis</i> (L.) Bernh.	+	+	+	+
<i>C. fragilis</i> 4x x <i>fragilis</i> 6x	—	+ ⁿ	—	—
<i>C. prob. dickieana</i> x <i>fragilis</i>	—	+ ⁿ	+ ⁿ	+ ⁿ
<i>C. dickieana</i> Sim.	—	+ ⁿ	+ ⁿ	—
<i>C. regia</i> (L.) Desv.	—	—	—	+ ⁿ
<i>C. prob. fragilis</i> x <i>regia</i>	—	—	—	+ ⁿ
<i>Woodsia alpina</i> (Bolton) S. F. Gray	—	+ ⁿ	—	—
Aspidiaceae				
<i>Polystichum lonchitis</i> (L.) Roth	—	+	—	—
<i>P. woronowii</i> Fomin	—	+	—	—
<i>P. aculeatum</i> (L.) Roth	— ^h	+	—	+
<i>P. x luerssenii</i> (Dörfler) Hahne (<i>P. aculeatum</i> x <i>braunii</i>)	—	+ ⁿ	—	—
<i>P. x bicknellii</i> (Christ) Hahne (<i>P. aculeatum</i> x <i>setiferum</i>)	—	+ ⁿ	—	—
<i>P. braunii</i> (Spencer) Fée	—	+ ^d	—	—
<i>P. setiferum</i> (Forsk.) Woyнар	+	+	—	+
<i>Dryopteris oreades</i> Fomin (<i>D. abbreviata</i> auct.)	—	+	—	—
<i>D. x initialis</i> Fraser-Jenkins & Corley (<i>D. caucasica</i> x <i>oreades</i>)	—	+ ⁿ	—	—
<i>D. caucasica</i> (A.Br.) Fraser-Jenkins & Corley	+ ⁱ	+ ^{c,i,k}	—	—
<i>D. x euxinensis</i> Fraser-Jenkins & Corley	+ ⁱ	+ ^{c,i}	—	—
<i>D. filix-mas</i> (L.) Schott	+	+	+ ^d	+

	Turkey in Europe	North Anatolia	Inner Anatolia	Mediterranean Turkey
<i>D. affinis</i> (Lowe) Fraser-Jenkins				
subsp. <i>borreri</i> (Newman) Fraser-Jenkins ^a	+	+	—	— ^o
(<i>D. borreri</i> Newman; <i>D. pseudomas</i> (Wollaston) Holub & Pouzar)				
subsp. <i>coriacea</i> Fraser-Jenkins ^a	—	+ ⁿ	—	—
<i>D. aemula</i> (Aiton) Kunze	—	+ ^c	—	—
(<i>D. liliana</i> Goligin)				
<i>D. pallida</i> (Bory) Fomin				
subsp. <i>pallida</i>	—	—	+ ^{d,k}	+
subsp. <i>libanotica</i> (Rosenst.) Nardi	—	—	—	+ ^p
<i>D. submontana</i> (Fraser-Jenkins & Jermy)				
Fraser-Jenkins	—	—	—	+ ⁿ
<i>D. remota</i> (A. Br.) Druce	—	+ ⁿ	—	—
<i>D. carthusiana</i> (Vill.) H. P. Fuchs	+ ^q	+	—	—
(<i>D. spinulosa</i> (Müll.) Watt)				
<i>D. x deweveri</i> (Jansen) Jansen & Wachter	—	+ ⁿ	—	—
(<i>D. carthusiana</i> x <i>dilatata</i>)				
<i>D. dilatata</i> (Hoffm.) A. Gray	—	+	—	—
(<i>D. austriaca</i> (Jacq.) Woytnar)				
<i>D. x ambroseae</i> Fraser-Jenkins & Jermy	—	+ ^l	—	—
(<i>D. dilatata</i> x <i>expansa</i>)				
<i>D. expansa</i> (C. Presl) Fraser-Jenkins & Jermy	—	+ ^{c,k}	—	—
(<i>D. assimilis</i> S. Walker)				
Blechnaceae				
<i>Blechnum spicant</i> (L.) Roth	+	+	—	+
Salviniaaceae				
<i>Salvinia natans</i> (L.) All.	+ ^{a,d}	—	—	+

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APPENDIX I: NEW RECORDS

POLYPODIACEAE

Polypodium x mantoniae

A7 Trabzon: Küçükkonak, Zigana pass, 5 ix 1970, *Fraser-Jenkins* 2267 (BM, G).

P. cambricum

A7 Trabzon: Trabzon to Maçka, 5 ix 1970, *Fraser-Jenkins* 2264 (BM, G).

ASPLENIACEAE

Asplenium trichomanes* subsp. *trichomanes

A1 Trabzon: Zigana pass 10 km below top, 5 ix 1970, *Fraser-Jenkins* 2283 (BM, G);

A8 Çoruh: Hopa to Kemalpaşa, 200 m, 25 viii 1973, *Fraser-Jenkins* 3997 (BM, G);

SE of Arhavi, near Kavak, Çiftköprü, 200 m, 26 viii 1973, *Fraser-Jenkins* 4017 (BM, G).

A. trichomanes* subsp. *quadrivalens

A1(E) Kırklareli: Istranca Da., Mahya Da., 700 m, 30 vii 1973, *Fraser-Jenkins* 3897 (BM, G).

A8 Çoruh: Artvin to Tortu, Yusufeli, 10 ix 1970, *Fraser-Jenkins* 2392 (BM).

C5 İçel: Tarsus, Gülek Boğaz, on rocks, 1350 m, 16 ix 1975, *Coşkun* 198 (E).

A. sp., nr *A. creticum* Lovis, Reichstein & Zaffran

C4 Antalya: N side of Geyik Da., N-facing shaded calc. cliff, above shepherd's hut, 2250 m, 12 ix 1979, *Fraser-Jenkins* 9812–9816 & S. J. de C. Coombs (BAKU, BM, herb. Reichstein);

Geyik Da., 2500 m, *Davis* 14513—det. as *A. bourgaei* in *Fl. Turkey*.

A. onopteris x adiantum-nigrum

A8 Rize: Khabakhor valley, above İkizdere, 1000 m, 28 viii 1973, *Fraser-Jenkins* 4050 (BM, G, ISTF, herb. Reichstein).

A. adiantum-nigrum x woronowii

A8 Trabzon: N of Bayburt, above Çaykara, Soğanlı Da. pass, 1500 m, 29 viii 1973, *Fraser-Jenkins* 4067 (BM).

A. septentrionale subsp. septentrionale

A8 Rize: S of Ardeşen, Çat to Çamlıhemşin, Firna valley, 1000 m, 27 viii 1973, *Fraser-Jenkins* 4028 (BM); *ibid.*, 200 m, *Fraser-Jenkins* 4040 (BM, G).

A. septentrionale subsp. caucasicum

A8 Rize: S of Ardeşen, Çat to Çamlıhemşin, Firna valley, 1000 m, 27 viii 1973, *Fraser-Jenkins* 4026, 4027 (BM); *ibid.*, 200 m, *Fraser-Jenkins* 4039 (BM); Kırklar Da., Khabakhor valley, above İkizdere, 1000 m, 28 viii 1973, *Fraser-Jenkins* 4053 (BM, ISTF).

A8 Trabzon: N of Bayburt, above Çaykara, Soğanlı Da. pass, 1500 m, 29 viii 1973, *Fraser-Jenkins* 4063 (BM, G).

A. x heuffleri (2x)

A8 Rize: Kırklar Da., Khabakhor valley, above İkizdere, 1000 m, 28 viii 1973, *Fraser-Jenkins* 4052 (BM, ISTF, herb. Reichstein).

A8 Trabzon: N of Bayburt, above Çaykara, Soğanlı Da. pass, 1500 m, 29 viii 1973, *Fraser-Jenkins* 4064 (BM, ISTF, herb. Reichstein).

A. ceterach subsp. ceterach x subsp. bivalens

C5 İçel: Gülek pass, 1100 m, viii 1965, *Hansen (Reichstein 1599)* (herb. Reichstein).

ATHYRIACEAE

Cystopteris prob. dickieana x fragilis

A9 Çoruh: E side of Yalnızçam Da., 2200 m, 22 viii 1973, *Fraser-Jenkins* 3986 (BM, G).

B9 Erzurum: Çakmak Da., Karayazi, cliffs, 11 ix 1970, *Fraser-Jenkins* 2407 (BM, G).

C2 Antalya: Kizilcadag, 24 viii 1970, *Fraser-Jenkins* 2144 (BM, G).

This hybrid cannot be verified from herbarium specimens. The cited collections were growing with the supposed parental species and have non-spiny abortive spores.

C. dickieana

A8 Rize: Khabakhor valley, above İkizdere, 1000 m, 28 viii 1973, *Fraser-Jenkins* 4056 (ISTF).

B3 Bilecik: Bursa to Eskişehir, Aksu valley, Yeşiladağ, 10 km W of Murat de., 24 km W of Bozüyük, c. 1000 m, 18 vi 1977, *Fraser-Jenkins* 5896 (BM).

B9 Erzurum: Çakmak Da., Karayazi, cliffs, 11 ix 1970, *Fraser-Jenkins* 2406 (BM, G).

C. fragilis 4x x fragilis 6x

A7 Trabzon: Zigana pass, 3 km above Hamsiköy, 1330 m, 30 viii 1973, *Fraser-Jenkins* 4085 (BM, G).

A8 Trabzon: N of Bayburt, above Çaykara, Soğanlı Da. pass, 1500 m, 29 viii 1973, *Fraser-Jenkins* 4071 (BM, G).

C. prob. fragilis x regia

C4 Antalya: N side of Geyik Da., N-facing calc. cliffs, above shepherd's huts, 2050 m, 12 ix 1979, *Fraser-Jenkins* 9807 & *S. J. de C. Coombs* (BM).

This hybrid cannot be verified from herbarium specimens. The cited collection was growing with the supposed parental species and had abortive spores.

C. regia

B6 Maraş: Goksun, Binboğa Da., above Yalak, 2300–2400 m, *Davis, Dodds & Çetlik*, D. 20122 (E).

C4 Antalya: W side of Geyik Da., 2300 m, 9 ix 1979, *Fraser-Jenkins* 9788–9792 & *S. J. de C. Coombs* (BM).

Woodsia alpina

A8 Trabzon: N of Bayburt, above Çaykara, Soğanlı Da. pass, 2000 m, 29 viii 1973, *Fraser-Jenkins* 4073 (BM, ISTF, herb. Reichstein, herb. Vida).

ASPIDACEAE

Polystichum x luerseani

A7 Trabzon: Zigana pass, 10 km below top, 5 ix 1970, *Fraser-Jenkins* 2293 (BM, G); Zigana pass, 6 km above Hamsiköy, 1500 m, 30 vii 1973, *Fraser-Jenkins* 4090 (BM).

P. x bicknellii

A7 Giresun: Piraziz, W of Bulancak, 4 ix 1970, *Fraser-Jenkins* 2260 (BM, G).

Dryopteris x initialis

A7 Trabzon: Zigana pass, 6 km above Hamsiköy, 1500 m, 30 viii 1973, *Fraser-Jenkins* 4087 (BM, G, ISTF).

D. affinis subsp. **coriacea**

A8 Çoruh: Hopa to Kemalpaşa, 200 m, 25 viii 1973, *Fraser-Jenkins* 3991–3993 (BM, ISTF).

D. submontana

C4 Antalya: N side of Geyik Da., N-facing calc. cliffs, above shepherd's huts, 2050 m, 12 ix 1979, *Fraser-Jenkins* 9809–9811 & S. J. de C. Coombs (BM, herb. Reichstein).

D. remota

A8 Rize: S of Ardeşen, Çat to Çamlıhemşin, Firna valley, 1000 m, 27 viii 1973, *Fraser-Jenkins* 4037 (BM, LE, TBI, herb. Reichstein).

D. x deweveri

A8 Rize: S of Ardeşen, Çat to Çamlıhemşin, Firna valley, 1000 m, 27 viii 1973, *Fraser-Jenkins* 4023 (BM, G) (with *D. carthusiana*, *Fraser-Jenkins* 4022).

APPENDIX 2: DESCRIPTION OF A NEW SUBSPECIES

BY C. R. FRASER-JENKINS & J. D. LOVIS

Asplenium septentrionale subsp. **caucasicum** Fraser-Jenkins & Lovis, **subsp. nov.**

Subspeciei *septentrionali* simillimum sed segmentis et costis angustioribus, fronde graciliore, sporis minoribus et cytotypo diploideo differt.

Typus. *Asplenium septentrionale* subsp. *caucasicum*, U.S.S.R., Abkhazia, 25 km above Ritsa, Lashipse-Bzib valley, between Sochi and Sukhumi, 24 vi 1971, *Fraser-Jenkins* 2767 (holo. BM; iso. BM, E, G). Paratypes *Fraser-Jenkins* 2768–2772, other information as for holotype (BM, G).