



NEW RECORDS OF NATIVE AND ALIEN VASCULAR PLANTS FROM ABRUZZO, LAZIO AND MOLISE NATIONAL PARK (ITALY) – AND ADDITIONS TO THE FLORA OF ABRUZZO AND MOLISE ADMINISTRATIVE REGIONS

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ABSTRACT - The Abruzzo, Lazio and Molise National Park, a flagship conservation area in Italy, is a hotspot of floristic diversity and a crossroad for plant biogeography. In this work, as a result of recent field studies in the Park and herbarium revisions, we report 10 taxa new or confirmed for the Abruzzo administrative region, and 3 for the Molise administrative region. Moreover, 47 taxa of vascular plants (41 native and 6 alien taxa) that are new or confirmed for the flora of the Park are reported. Five taxa are excluded from the flora of the Park.

KEYWORDS: ALIEN SPECIES, APENNINES, DISTRIBUTION, NATIVE SPECIES, REGIONAL FLORA, VASCULAR FLORA.

INTRODUCTION

The Abruzzo, Lazio and Molise National Park (Central Apennines, Italy) is one of the oldest National Parks in Europe, as it was designated in 1922. Since the 1970's, the Park set the standards for environmental planning of protected areas in Italy; nowadays it still represents an extremely important “flagship” conservation area (Sievert, 1999). Although originally conceived for the preservation of endemic mammals (Apennine chamois and Marsican bear), the Park is an area of exceptional value for plant biodiversity conservation as well (Burrascano et al., 2009; Conti & Bartolucci, 2015; Cancellieri et al., 2020). For instance, the Park hosts the southernmost outposts in Italy of many boreal or arctic-alpine species, bound to cool and wet conditions (e.g. *Cypripedium calceolus* L.,

Eriophorum latifolium Hoppe, *Gymnocarpium dryopteris* (L.) Newman, *Vaccinium myrtillus* L., etc.) (Conti & Bartolucci, 2015), giving rise to an extrazonal “island” of a northern biota within the Mediterranean (Spada & Sulli, 1988). At the same time, the Park's buffer area includes the slopes of the Fucino basin – a huge intermontane tectonic depression that hosts a number of highly disjunct populations of steppic species (e.g. *Festuca valesiaca* Schleich. ex Gaudin subsp. *valesiaca*, *Astragalus exscapus* L. subsp. *exscapus*), interpreted as a relict of the Pleistocene steppe biota (Cancellieri et al., 2017; Filibeck et al., 2020).

Moreover, recent work revealed that the Park's grasslands feature high levels of plant alpha-diversity at fine spatial

grain (species density), when compared to other European grasslands (Filibeck et al., 2019); however, as in other areas of the Apennines, they are threatened by the dramatic decrease in sheep farming and land-use changes, often leading to fast reforestation processes (Bracchetti et al., 2012) or tall-grass encroachment (Malatesta et al., 2019). Finally, in spite of its karst morphology, the Park hosts a variety of aquatic habitats and small wetlands (e.g. Conti, 1994); particularly noteworthy is Scanno Lake, the largest natural montane lake of the Apennines, threatened by increased urbanization and tourism pressure.

A series of increasingly comprehensive floras have surveyed the vascular flora of the Park (Grande, 1904; Anzalone & Bazzichelli, 1960; Conti, 1995; Conti & Bartolucci, 2015), not to mention a high number of shorter floristic notes and partial contributions. According to Conti & Bartolucci (2015), the Park's flora, including its buffer area (that more than doubles the Park's surface), comprises 2,114 taxa (species and subspecies). Nevertheless, the Park is still yielding a number of – sometimes surprising – new findings (see e.g. Cancellieri et al., 2017; Conti et al., 2019; Filibeck et al., 2020; Conti & Bartolucci, 2021).

The aim of this contribution is to report on some further species new to the Park – and sometimes to the whole administrative region(s) – that were discovered or re-discovered during field work in 2020-2021.

MATERIALS AND METHODS

The investigated area is located in the central section of the Apennines range and corresponds to the National Park of Abruzzo, Lazio and Molise and its “Zona di Protezione Esterna” – a wide buffer area legally designated in order to reduce the impact of hunting on wildlife –, with a total area of c.130,500 hectares; elevation ranges between c. 400 and c. 2,200 m a.s.l. (see Conti & Bartolucci, 2015, Primi et al., 2016, and Cancellieri et al., 2020, for details on physical habitat, land-use and vegetation cover). The new floristic data reported here are based on field investigations carried out mainly during 2020-2021 (including vegetation surveys performed in order to map the Habitat Types of Community Interest), and bibliographic analysis. Submerged plants of lake bottoms were surveyed by means of a double row rake dredged from a boat. Collected herbarium specimens are preserved in APP and HLUC (acronyms follow Thiers, 2021), and in the private collection *Herbarium Cancellieri*.

Nomenclature follows the checklists of the Italian native (Bartolucci et al., 2018a) and alien (Galasso et al., 2018) vascular flora, and subsequent updates summarized in the Portal to the Flora of Italy (2021+; see also Martellos et al., 2020).

Taxa are listed alphabetically. For each taxon the following information are provided: currently accepted name; family; reasons for listing the taxon (i.e., new for the Park's flora, confirmation of ancient record, etc.); current invasiveness status (only for the alien units); examined herbarium materials, with details about the finding location (in the original language of the herbarium voucher label), N and E metric coordinates (UTM datum WGS84), altitude, habitat, collection date, collector(s) (in italic), and herbarium storage code; any additional notes. The Italian distribution is reported only for taxa new for the administrative regions. The taxa new or confirmed for the Park are in bold italic. The taxa to be excluded from the Park's flora are in italic.

RESULTS AND DISCUSSION

Adonis flammea Jacq. subsp. ***flammea*** (*Ranunculaceae*)

Confirmed for the flora of the National Park.

Collelongo (L'Aquila), UTM WGS84: 33T 382070 E, 4641804 N, pendici del Monte Annamunna, pascoli, pendii rupestri, 1000 m, 20.05.2021, *F. Bartolucci e F. Conti* (APP No. 66076). Ancient record for Villavallelonga (Steinberg, 1971 from a specimen collected by Grande).

Aubrieta columnae Guss. subsp. *italica* (Boiss.) Mattf. (*Brassicaceae*)

Casual alien subspecies new for the flora of Abruzzo and for the National Park.

Bisegna (L'Aquila), San Sebastiano, UTM WGS84: 33T 397123 E, 4643881 N, vecchi muri di pietra calcarea, 1050 m, 15.06.2020, *L. Rosati e L. Cancellieri* (HLUC, *Herb. Cancellieri*).

In Italy it was recorded as native for Puglia, doubtful in Basilicata and naturalized in Lazio (Bartolucci et al., 2018a; Rosati et al., 2020).

Biscutella cichoriifolia Loisel. (*Brassicaceae*)

New for the flora of the National Park.

Collelongo (L'Aquila), UTM WGS84: 33T 382070 E, 4641804 N, pendici del Monte Annamunna, pascoli, pendii rupestri, 1000 m, 20.05.2021, *F. Bartolucci e F. Conti* (APP No. 66075).

Callitriche truncata Guss. subsp. ***truncata*** (*Callitrichaceae*)

New for the flora of Molise and for the National Park

Colli a Volturmo (Isernia), UTM WGS84: 33T 426532 E, 4603351 N, Bosco Frascaro sulla riva destra del Rio Chiaro, presso la confluenza con il Volturmo, bosco di *Quercus*

frainetto, 300 ca. m, 25.04.1998, *F. Conti* (APP No. 48603). In Italy it was recorded for Lazio, Sicilia and Sardegna (Bartolucci et al., 2018a).

This record was erroneously referred to *Callitriche brutia* (Conti e Bartolucci 2015).

***Campanula portenschlagiana* Schult. (Campanulaceae)**

Casual alien species new for flora of the National Park.

Ortona dei Marsi (L'Aquila), UTM WGS84: 33T 394551 E, 4650190 N, vecchi muri di pietra calcarea, 1000 m, 15.06.2020, *L. Rosati* e *L. Cancellieri* (HLUC, *Herb. Cancellieri*).

***Cardamine heptaphylla* (Vill.) O.E.Schulz (Brassicaceae)**

To be excluded from the flora of the National Park.

C. heptaphylla was reported from the Park's area only in ancient records, at Tre Confini (Terracciano, 1873) and S. Donato (Falqui, 1899). In the same localities, we found *C. kitaibelii* Bech. which has sometimes been confused with *C. heptaphylla* in other areas of the Central Apennines. Thus, *C. heptaphylla* should be excluded from the flora of the National Park.

***Carlina lanata* L. (Asteraceae)**

New for the flora of the National Park.

Anversa degli Abruzzi (L'Aquila), UTM WGS84: 401268 E 4649938 N, Gole del Sagittario tra Cavuto e la frana, riva sinistra del fiume, incolti e pascoli, 08.07.2009, *F. Conti* (APP No. 41583).

***Ceratophyllum demersum* L. (Ceratophyllaceae)**

New for the flora of the National Park.

Scanno (L'Aquila), Lago di Scanno, UTM WGS84: 33T 405340 E 4642234 N, acque lentiche fino a 6 m di profondità, 925 m, 16.08.2021, *L. Rosati* (HLUC); Trasacco (L'Aquila), canale, UTM WGS84: 33T 378742 E 4646212 N, acque correnti, 650 m, 31.05.1990, *F. Conti* (APP No. 36604, 36606).

***Chaerophyllum magellense* Ten. (Apiaceae)**

Italian endemic, new for the flora of Molise.

Pizzone (Isernia), Le Forme, UTM WGS84: 33T 415282 E 4616164 N, prati, 1400 m, 02.07.1989, *F. Conti* (APP No. 28778); Pizzone (Isernia), Valle Pagana, UTM WGS84: 33T 413722 E 4615928 N, pascoli e praterie, 1800-1900 m, 25.07.1990, *F. Conti* (APP No. 28784); idem, 26.07.1990, *F. Conti* (APP No. 28779, 28780); Pizzone (Isernia), la Metuccia-M. a Mare, Mainarde, UTM WGS84: 33T 413534 E 4614619 N, pendii rupestri, 2000 m, 08.07.1992, *F. Conti* (APP No. 28781); Pizzone (Isernia), Costa dell'Altare, UTM WGS84: 33T 415777 E 4612570 N, pendii rupestri, 28.08.1991, *F. Conti* (APP No. 28783); Pizzone (Isernia),

Valle Fredda, UTM WGS84: 33T 413619 E 4615479 N, pascolo sommitale, 1800-2000 m, 16.06.1993, *F. Conti* (APP No. 28785, 28786, 28787); Pizzone (Isernia), Valle Fredda, UTM WGS84: 33T 413619 E 4615479 N, pascoli e praterie, 1700 m, 03.08.1993, *F. Conti* (APP No. 28788).

In Italy it was recorded for the Apennines except Marche, Molise and Basilicata and doubtful in Umbria (Bartolucci et al., 2018a). In the Park, the species was already known for several localities in the Abruzzo and Lazio sectors.

***Colutea breviaolata* Lange (Fabaceae)**

New for the flora of the National Park.

Pescina (L'Aquila), UTM WGS84: 33T 389945 E 4653954 N, 13.06.2017, margine boschivo, *F. Bartolucci* e *F. Conti* (APP No. 59687); Collelongo (L'Aquila), UTM WGS84: 33T 382070 E, 4641804 N, pendici del Monte Annamunna, margine boschivo, 1000 m, 14.06.2021, *F. Bartolucci* e *F. Conti* (APP No. 66085).

***Draba verna* L. subsp. *verna* (Brassicaceae)**

New for the flora of the National Park.

Roccaraso (L'Aquila), Piano Aremogna, presso il lago di Castello, UTM WGS84: 33T 421828 E 4628227 N, incolti aridi, 1400-1420 m, 23.06.1995, *F. Conti* (APP No. 24218).

***Elodea canadensis* Michx. (Hydrocharitaceae)**

Naturalized alien species new for the flora of the National Park. Trasacco (L'Aquila), canale, UTM WGS84: 33T 378742 E 4646212 N, ambienti umidi, 650 m, 31.05.1990, *F. Conti* (APP No. 66108); Scanno (L'Aquila), Lago di Scanno, UTM WGS84: 33T 405286 E 4641939 N, acque lentiche fino a 4 m di profondità, 925 m, 16.08.2021, *L. Rosati* (HLUC).

***Ervilia loiseleurii* (M.Bieb.) H.Schaef. (Fabaceae)**

New for the flora of Abruzzo and for the National Park.

Ortona dei Marsi (L'Aquila), base del versante Fresciote, UTM WGS84: 33T 393800 E, 4651085 N, bosco di roverella, 900 m, 09.06.2020, *L. Cancellieri* (*Herb. Cancellieri*). Villavallelonga (L'Aquila), M. Fontecchia, I Morrioni, UTM WGS84: 33T 388897 E 4634942 N, cerreta secondaria su terrazzamento abbandonato, 1200 m, 15.05.2020, *L. Cancellieri* e *G. Filibeck* (*Herb. Cancellieri*).

In Italy it was recorded for all the administrative regions except Valle d'Aosta, Piemonte, Abruzzo, Calabria and as doubtfully occurring in Umbria and Sicilia (Bartolucci et al., 2018a).

***Festuca rubra* L. subsp. *juncea* (Hack.) K.Richt. (Poaceae)**

New for the flora of the National Park.

Gioia dei Marsi (L'Aquila), Fosso della Padura, UTM WGS84: 33T 398997 E 4634740 N, torbiera, 1270 m, 03.07.2021, *L. Cancellieri*, *G. Filibeck* e *G. Cangelmi* (*Herb. Cancellieri*).

Festuca trichophylla (Ducros ex Gaudin) K.Richt. subsp. *trichophylla* (*Poaceae*)

New for the flora of Abruzzo and for the National Park.

Ortona dei Marsi (L'Aquila), Fiume Giovenco, UTM WGS84: 33T 393879 E 4651226 N, ambiente perifluviale, 830 m, 21.07.2020, *L. Cancellieri* (*Herb. Cancellieri*). Balsorano (L'Aquila), I Ridotti, versante SW di M. Cornacchia, UTM WGS84: 33T 385375 E 4627388 N, piccolo impluvio in ambito di ghiaione, 897 m, 26.05.2021, *L. Cancellieri* (*Herb. Cancellieri*); Scanno (L'Aquila), Masseria Parenti, Valle Tasso, UTM WGS84: 33T 408069 E 4634870 N, Torbiera, 1250 m, 01.07.2021, *L. Cancellieri* (*Herb. Cancellieri*).

In Italy it was recorded for the North (except Liguria) and for Toscana, Lazio and Calabria (Bartolucci et al., 2018a).

Filipendula vulgaris Moench (*Rosaceae*)

Confirmed for the flora of the National Park.

Gioia dei Marsi (L'Aquila), Templo, UTM WGS84: 33T 398099 E 4635841 N, dry meadow, 1330 m, 21.07.2020 (photograph by *L. Cancellieri*); Ortucchio (L'Aquila), Ciocco Nacenzio, UTM WGS84: 33T 383317 E 4642707 N, radura arida in bosco termofilo, 1002 m, 19.06.2021, *G. Cangelmi e L. Cancellieri* (APP No. 66115).

Ancient record for the surroundings of Villavallelonga (Grande, 1904).

Fragaria viridis Weston subsp. *viridis* (*Rosaceae*)

New for the flora of the National Park.

Collelongo (L'Aquila), pendici del Monte Annamunna, UTM WGS84: 33T 382070 E 4641804 N, pascoli, pendii rupestri, 1000 m, 20.05.2021, *F. Bartolucci e F. Conti* (APP No. 66074).

Gelasia hirsuta (Gouan) Zaika, Sukhor. & N.Kilian (*Asteraceae*)

New for the flora of the National Park.

Bisegna (L'Aquila), UTM WGS84: 33T 396962 E 4641782 N, 02.10.2011, *F. Minutillo* (APP No. 58498).

Genista januensis Viv. subsp. *januensis* (*Fabaceae*)

Confirmed for the flora of the National Park.

Ortona dei Marsi (L'Aquila), presso Carrito, UTM WGS84: 33T 393784 E 4653738 N, prati aridi, 940 m, 13.05.2006, *F. Conti, B. Santucci e M. Miglio* (APP No. 33296); Ortona dei Marsi (L'Aquila), M. Tricella, UTM WGS84: 33T 393065 E 4648141 N, pascoli aridi, 1300 m, 29.05.2017, *F. Bartolucci, F. Conti e L. Di Martino* (APP No. 59665).

Ancient record for La Difesa (Grande, 1904), but, according to Anzalone & Bazzichelli (1960), the specimens collected by Grande probably belong to *G. tinctoria*.

Helleborus viridis L. subsp. *abruzzicus* (M.Thomsen, McLewin & B.Mathew) Bartolucci, F.Conti & Peruzzi (*Ranunculaceae*)

New for the flora of the National Park.

Cocullo (L'Aquila), Passo Olmo di Bobbi, UTM WGS84: 33T 397145 E 4654644 N, 06.05.2017, *F. Conti e F. Bartolucci* (APP No. 59681).

Heuchera sanguinea Engelm. (*Saxifragaceae*)

Casual alien species new for the flora of the National Park.

Ortona dei Marsi (L'Aquila), UTM WGS84: 33T 394551 E 4650190 N, vecchi muri di pietra calcarea, 1000 m, 15.06.2020, *L. Rosati e L. Cancellieri* (HLUC, *Herb. Cancellieri*).

Hieracium prenanthoides Vill. subsp. *prenanthoides* (*Asteraceae*)

New for the flora of the National Park.

Pizzone (Isernia), Monti della Meta: sent. 111 zum Passo dei Monaci, UTM WGS84: 33T 413483 E 4616215 N, buchenwald, hochst., rasen, schutt, 1700-1900 m, 01.08.2000, *G. Gottschlich* and *F.G. Dunkel 41681* (APP No. 63266).

Hieracium racemosum Waldst. & Kit. ex Willd. subsp. *virgaurea* (Coss.) Zahn (*Asteraceae*)

New for the flora of the National Park.

San Biagio Saracinisco (Frosinone), Morrone delle Rose, UTM WGS84: 33T 415149 E 4609861 N, 1600 m, 02.10.1991, *F. Conti* (APP No. 1556).

Hyparrhenia sinaica (Delile) Llaurodó ex G.López (*Poaceae*)

New for the flora of Abruzzo and for the National Park.

Pescosolido (Frosinone), Vallone Lacerno, presso la discarica, UTM WGS84: 33T 389249 E 4628295 N, campi e ambienti ruderali, 800 m, 31.07.1995, *F. Conti* (APP No. 30219, 30220, 30221, 30222); Balsorano (L'Aquila), allo sbocco del V.ne S. Angelo, UTM WGS84: 33T 381896 E 4630592 N, margine di oliveto su terrazzi calcarei, 530 m, 26.05.2021, *L. Cancellieri, G. Cangelmi e G. Filibeck* (*Herb. Cancellieri*).

In Italy recorded for Toscana, Puglia, Calabria, Sicilia, Sardegna (Bartolucci et al., 2018a), and recently reported for Umbria and Lazio (Bartolucci et al., 2019, 2021).

Lamium bifidum Cirillo subsp. *balcanicum* Velen. (*Lamiaceae*)

New for the flora of the National Park.

Pescasseroli (L'Aquila), Difesa, UTM WGS84: 33T 398233 E 4626737 N, pascoli, 23.05.2018, *F. Bartolucci* (APP No. 59920).

Lathraea squamaria L. (*Orobanchaceae*)

New for the flora of the National Park.

Collelongo (L'Aquila), Valle Canale, UTM WGS84: 33T 377864 E 4640053 N, bosco, 900 m, 25.05.2021, *F. Bartolucci e F. Conti* (APP No. 66077).

***Lycopsis arvensis* L. (Boraginaceae)**

New for the flora of the National Park.

Gioia dei Marsi (L'Aquila), Colle Truscino, fields, 06.06.2017 (photograph by F. Conti).

***Lysimachia talaverae* L. Sáez & Aymerich (*L. nardii* Arrigoni; *Anagallis parviflora* Hoffmanns. & Link) (Primulaceae)**

New for the flora of the National Park.

Rocchetta a Volturno (Isernia), M. Castelnuovo, UTM WGS84: 33T 419701 E 4609286 N, prati aridi, 1200 m, 05.05.1993, F. Conti (APP No. 23667).

***Malus florentina* (Zuccagni) C.K. Schneid. (Rosaceae)**

Confirmed for the flora of the National Park.

Collelongo (L'Aquila), Amplero, UTM WGS84: 33T 385220 E 4640344 N, bosco di roverella, 910 m, 15.05.2020, L. Cancellieri e G. Filibeck (*Herb. Cancellieri*); Collelongo (L'Aquila), M. Annamunna, lungo la sella tra Tristeri e Amplero, UTM WGS84: 33T 383528 E 4641015 N, querceto misto a roverella e cerro, 949 m, 18.06.2021, L. Cancellieri e G. Cangelmi (*Herb. Cancellieri*).

Ancient record for Villavallelonga (Grande, 1924).

***Medicago ×varia* Martyn (Fabaceae)**

Naturalized alien species new for the flora of the National Park.

Collelongo (L'Aquila), pendici del Monte Annamunna, UTM WGS84: 33T 382070 E 4641804 N, margine boschivo, 1000 m, 14.06.2021, F. Bartolucci e F. Conti (APP No. 66086).

***Melampyrum cristatum* L. subsp. *cristatum* (Orobanchaceae)**

New for the flora of the National Park.

Collelongo (L'Aquila), pendici del Monte Annamunna, UTM WGS84: 33T 382723 E 4642151 N, radura boschiva, 1038 m, 14.06.2021, F. Bartolucci e F. Conti (APP No. 66091).

***Myriophyllum spicatum* L. (Haloragaceae)**

New for the flora of the National Park.

Scanno (L'Aquila), Lago di Scanno, UTM WGS84: 33T 405286 E 4641939 N, acque lentiche tra 2 e 4 m di profondità, 925 m, 16.08.2021, L. Rosati e G. Filibeck (HLUC); it was also observed in the artificial lake of Barrea (Barrea, L'Aquila, UTM WGS84: 33T 405747E 4641082 N), 04.08.2021, L. Rosati.

***Onobrychis alba* (Waldst. & Kit.) Desv. subsp. *pentelica* (Hausskn.) Nyman (Fabaceae)**

New for the flora of Abruzzo and Molise, and for the National Park.

Pizzone (Isernia), primo Circo glaciale sotto La Metuccia, UTM WGS84: 33T 413619 E 4615479 N, pascolo, 1800 m,

07.06.1989, F. Conti (APP no. 28874, 29888); ibidem, 06.07.1989, F. Conti (APP No. 28875, 28876, 28877); ibidem, 20.07.1991, F. Conti (APP No. 28879); Pizzone (Isernia), La Metuccia-Monte a Mare, UTM WGS84: 33T 413534 E 4614619 N, pascolo montano, 2000-2150 m, 08.07.1992, F. Conti (APP No. 28872); Pizzone (Isernia), Costa tra Valle Sorgiara e Valle Fredda, UTM WGS84: 33T 413247 E 4615475 N, prato arido, 1800 m, 04.08.1993, F. Conti (APP No. 28873); Barrea (L'Aquila), M. Petroso - M. Altare, cresta, UTM WGS84: 33T 410106 E 4619056 N, pascoli altitudinali, 1900-2249 m, 01.08.1997, F. Conti (APP No. 33743); Ortona dei Marsi (L'Aquila), Vallone d'Onofrio, UTM WGS84: 33T 398219 E 4646999 N, pascoli, 1450-1500 m, 27.06.2003, D. Tinti (APP No. 16323); Barrea (L'Aquila), Valle Cupella, M. Petroso, UTM WGS84: 33T 411608 E 4619666 N, 1900-2100 m, 14.07.2009, F. Conti (APP No. 49406, 49455); Bisegna (L'Aquila), M. Argatone, UTM WGS84: 33T 402381 E 4639239 N, 1600-2100 m, 28.07.2010, F. Conti e G. Serafini (APP No. 49524); Opi (L'Aquila), tra M. Irto e M. S. Nicola, Serra delle Gravare, UTM WGS84: 33T 405988 E 4620511 N, 06.08.2010, F. Conti e G. Serafini (APP No. 48211, 48224); Villavallelonga (L'Aquila), V.ne Cervara, UTM WGS84: 33T 393144 E 4631697 N, pascoli, 1339 m, 12.06.2012, F. Conti (APP No. 51127); Pescasseroli (L'Aquila), M. di Valle Caprara, UTM WGS84: 33T 396592 E 4632583 N, pascoli, 1800-1900 m, 26.07.2010, F. Bartolucci e N. Ranalli (APP No. 49562, 49563, 49564, 49569, 49577, 49578.); S. Biagio Saracinisco (Frosinone), Morrone delle Rose, UTM WGS84: 33T 414037 E 4609746 N, pascoli, 1700 m, 02.10.1991, F. Conti (APP No. 28880); Rocca Altiera (Settefrati), UTM WGS84: 33T 407069 E 4616982 N, 1800-1900 m, 02.08.2010, F. Conti (APP No. 49175).

In Italy recorded for Campania, Puglia, Basilicata and Calabria (Bartolucci et al., 2018a). The new findings represent the northern border of the Italian distribution.

***Papaver apulum* Ten. (Papaveraceae)**

To be excluded from the flora of the National Park.

Previously, *P. apulum* was recorded in the Park in Gole del Sagittario and Collelongo (Conti & Tinti 2012 sub *P. hybridum* L.; Conti & Bartolucci, 2015) but these records should be referred to *P. argemone* L. (see below).

***Papaver argemone* L. (Papaveraceae)**

New for the flora of the National Park.

Anversa degli Abruzzi (L'Aquila), loc. la Taverna, sopra Castrovalva, tra il paese e la cima di Pizzo Marcello, UTM WGS84: 33T 393784 E 4653738 N, 25.06.2009, F. Conti (APP No. 40780); Anversa degli Abruzzi (L'Aquila), cresta sopra Castrovalva, UTM WGS84: 33T 400749 E 4648075 N, prati aridi, 800-1280 m, 29.05.2008, F. Conti (APP No.

33469); Ortona dei Marsi (L'Aquila), presso Carrito, UTM WGS84: 33T 393784 E 4653738 N, incolti aridi, 940 m, 13.05.2006, *F. Conti*, *B. Santucci* e *M. Miglio* (APP No. 33310).

Within the study area, it was also observed by us close to Collelongo (L'Aquila) (photos by *F. Conti* & *F. Bartolucci*, 04.05.2013)

Phelipanche schultzi (Mutel) Pomel (*Orobanchaceae*)

New for the flora of Abruzzo and for the National Park.

Gioia dei Marsi (L'Aquila), tra Gioia dei Marsi e Gioia Vecchio lungo la statale SS 83, UTM WGS84: 33T 393214 E 4643764 N, gariga, 970 m, 06.06.2017, *Bartolucci F. e F. Conti* (APP No. 57787).

In Italy the species is recorded for Valle d'Aosta, Liguria, Toscana, Puglia, Basilicata, Calabria, Sicilia and Sardegna (Portal to the flora of Italy 2020+).

Phlomis herba-venti L. subsp. *herba-venti* (*Lamiaceae*)

Confirmed for the flora of the National Park.

Pescina (L'Aquila), riva destra del Giovenco, UTM WGS84: 33T 389650 E 4653942 N, prati aridi, 800 m, 18.06.1995, *F. Conti* (APP No. 25846); ibidem, 15.07.1995, *F. Conti* (APP No. 25847, No. 25848, No. 25849, No. 25850, No. 25851, No. 25852, No. 25853).

Within the study area, it was also observed by us in Valle d'Amplero (photo by *G. Filibeck*, 15.5.2020) and near Collelongo (photos by *F. Conti* & *F. Bartolucci* 14.06.2021). It was previously generically recorded for the Park by Rovesti & Rovesti (1934).

Potamogeton perfoliatus L. (*Potamogetonaceae*)

New for the flora of the National Park.

Barrea (L'Aquila), Lago di Barrea, UTM WGS84: 33T 412887 E, 4624600 N, acque lentiche tra 2 e 4 m di profondità, 970 m, 06.08.2021, *L. Rosati* (HLUC).

Also observed forming very large patches of dead individuals in the dry bottom of Lago di Barrea, near Civitella Alfedena, in autumn 2021 when the water level was heavily lowered because of hydroelectric maneuvers (photo by *G. Filibeck*, 12.11.2021).

Potamogeton polygonifolius Pourr. (*Potamogetonaceae*)

To be excluded from the flora of the National Park.

Previously, *P. polygonifolius* was recorded in the Park only by Anzalone and Bazzichelli (1960) at Lago Vivo. Conversely, during this research we found, in the same lake, only *P. natans* [Barrea (L'Aquila), Lago Vivo, UTM WGS84: 33T 412914 E, 4619943 N, area umida, 1550 m, 13.07.2020, *L. Cancellieri* e *G. Cangelmi* (*Herb. Cancellieri*)].

The herbarium specimens from Lago Vivo collected by Anzalone and Bazzichelli and preserved in RO should be referred to *P. natans*. Thus, *P. polygonifolius* should be excluded from the flora of the National Park.

Primula veris L. subsp. *columnnae* (Ten.) Maire & Petitm. (*Primulaceae*)

Confirmed for the flora of the National Park.

Collelongo (L'Aquila), pendici del Monte Annamunna, UTM WGS84: 33T 382764 E 4642153 N, pascoli, pendii rupestri, 1040 m, 10.04.2021 (photos by *F. Conti* & *F. Bartolucci* 17.05.2021).

Ancient records at "Difensa" and "Angro" (Grande 1904).

Raphanus raphanistrum L. subsp. *raphanistrum* (*Brassicaceae*)

To be excluded from the flora of the National Park.

Previously recorded for Opi by Conti (1995), from a specimen collected by Rosati and preserved in the *Herbarium* of the National Park in Pescasseroli. The review of the specimen showed it should be referred, instead, to the subsp. *landra* (Moretti ex DC.) Bonnier & Layens.

Rosa nitidula Besser (*Rosaceae*)

New for the flora of the National Park.

Picinisco (Frosinone), S. Gennaro, UTM WGS84: 33T 407583 E 4609055 N, prato arido, 800 m, 25.05.1991, *F. Conti* (APP No. 25505); S. Biagio Saracinisco (Frosinone), Morrone delle Rose, UTM WGS84: 33T 414037 E 4609746 N, prato arido, 1500-1600 m, 02.10.1991, *F. Conti* (APP No. 25502).

Satureja hortensis L. (*Lamiaceae*)

Casual alien species new for the flora of the National Park.

Pescasseroli (L'Aquila), nel centro abitato, UTM WGS84: 33T 399579 E 4629341 N, fessure tra il selciato e i muri delle abitazioni, 925 m, 06.07.2020, *L. Rosati* (HLUC).

In the same locality, several plants were also observed in summer 2021 (*L. Rosati*).

Silene cretica L. (*Caryophyllaceae*)

To be excluded from the flora of the National Park.

It was previously recorded for Collelongo (Conti et al., 2017) but it should be referred to the following taxon.

Silene tenuiflora Guss. (*Caryophyllaceae*)

New for the flora of Abruzzo and to the National Park.

The record of *S. cretica* (Conti et al., 2017), for Chiaravalle near Collelongo, should be referred to this species, in Italy reported for Puglia, Calabria and Sicilia (Bartolucci et al., 2018a). The Park represents the northern border of its Italian distribution.

***Thalictrum flavum* L. (Ranunculaceae)**

Confirmed for the flora of the National Park.

Collelongo (L'Aquila), loc. Chiaravalle, UTM WGS84: 33T 381945 E 4640894 N, radura, 814 m, 14.06.2021, *F. Bartolucci e F. Conti* (APP No. 66097).

This species was recorded for Val Canneto (Tenore & Gussone, 1842; Petriglia, 2004) and generically for the National Park (Anzalone & Bazzichelli, 1960), but was considered as doubtfully occurring by Conti & Bartolucci (2015).

***Tilia platyphyllos* Scop. subsp. *platyphyllos* (Malvaceae)**

Subspecies new for the flora of the National Park.

Pizzone (Isernia), Valle di Mezzo, UTM WGS84: 33T 416916 E 4612450 N, bosco mesofilo, 1600 m, 23.07.1991, *F. Conti* (APP No. 26275); ibidem, 1100-1700 m, 05.08.1993, *F. Conti* (APP No. 26263); Scanno (L'Aquila), V.ne della Terratta, UTM WGS84: 33T 404767 E 4639931 N, bosco e margini, 1200-1600 m, 28.06.1997, *F. Conti* (APP No. 48774); Civitella Alfedena (L'Aquila), piazzale di S. Lucia, UTM WGS84: 33T 412300 E 4624514 N, 11.07.1999, *F. Conti* (APP No. 48720).

***Trifolium strictum* L. (Fabaceae)**

Confirmed for the flora of the National Park.

Villavallelonga (L'Aquila), Prati d'Angro, UTM WGS84: 33T 393275 E 4630310 N, margine di prato da sfalcio, 1200 m, 23.05.2020, *L. Cancellieri (Herb. Cancellieri)*.

Old record for Villavallelonga (Aia dei Merli) (Anzalone & Bazzichelli, 1960 from a specimen collected by Grande).

***Triticum biunciale* (Vis.) K.Rich. subsp. *biunciale* (Poaceae)**

New for the flora of Abruzzo and for the National Park.

Collelongo (L'Aquila), loc. Chiaravalle, UTM WGS84: 33T 381945 E 4640894 N, radura, 814 m, 14.06.2021, *F. Bartolucci e F. Conti* (APP No. 66095).

This species is considered a cryptogenic *taxon*, occurring in Italy in Puglia and Campania, and no longer recorded in Toscana and Veneto, doubtful in Emilia Romagna (Bartolucci et al., 2018a) and recently reported from Calabria (Bartolucci et al., 2018b). However, Perrino et al. (2014) reported a recent herbarium record also from Basilicata (Potenza, Cava near Moliterno, *R. Galesi* 107189, CAT).

***Verbascum alpinum* Turra (Scrophulariaceae)**

Confirmed for the flora of Abruzzo and for the National Park.

Collelongo (L'Aquila), Valle Canale, UTM WGS84: 33T 377864 E 4640053 N, margine boschivo, 900 m, 25.05.2021, *F. Bartolucci e F. Conti* (APP No. 66106).

In Abruzzo it was previously known only in the National Park, from an ancient record at Collelongo (Anzalone & Bazzichelli, 1960 from Grande); within the Park it is known

also for Val Canneto and Settefrati in Lazio (Anzalone & Bazzichelli, 1960; Anzalone et al., 2010) where it needs confirmation (Lucchese, 2018).

***Vicia laeta* Ces. (Fabaceae)**

Confirmed for the flora of Abruzzo and for the National Park. Collelongo (L'Aquila), Valle Canale, margine boschivo, UTM WGS84: 33T 380007 E 4640267 N, 858 m, 20.05.2021, *F. Bartolucci e F. Conti* (APP No. 66098).

The only previously known record for Abruzzo administrative region was from the National Park at "M. La Difesa" (Fiori, 1928).

***Zannichellia palustris* L. (Potamogetonaceae)**

Confirmed for the flora of the National Park.

Ortona dei Marsi (L'Aquila), lungo la strada per Bisegna UTM WGS84: 33T 396612 E 4646053 N, pozza poco profonda in ex-cava di argilla allagata, 1003 m, 19.06.2021, *L. Rosati* (HLUC).

Previously recorded as *Z. palustris* s.l. at Bosco Frascaro close to Rio Chiaro (Molise) (Conti & Bartolucci, 2015).

CONCLUSIONS

Despite the Park, along with its buffer area, is a well-studied sector of the Apennines, during recent floristic and phytosociological surveys we found 10 taxa new or confirmed for the Abruzzo administrative region, and 3 for the Molise administrative region. Moreover, we found 47 taxa of vascular plants that are new or confirmed for the flora of the Park (41 native and 6 alien taxa). Five taxa are to be excluded from the flora of the Park.

Some of the new records bear ecological and/or biogeographical significance, and call for a better understanding and active protection of the Park's ecosystems. For instance, the finding of *Silene tenuiflora* represents the northern border of its Italian distribution, while the finding of a large population of *Potamogeton perfoliatus* within the Barrea Lake is interesting because artificial lakes are usually devoid of macrophytes due to their frequent fluctuations of water level. Biogeographically important findings include *Festuca trichophylla* subsp. *trichophylla*, *Hyparrhenia sinaica*, *Onobrychis alba* subsp. *pentelica*.

Of particular concern is the finding of new alien taxa naturalized within natural habitats, in particular of aquatic plants such as *Elodea canadensis*. Another cause of concern can be related to the relatively high number of ornamental species that are newly becoming naturalized on old village walls and masonry, from where they could spread to natural chasmophytic habitats (Stinca et al., 2021).

Table 1. Summary of recorded taxa with information about native or alien status and relevance of findings.

Taxa	Native	Alien	New or conf. for Abruzzo	New for Molise	New or conf. for the Park	Excluded from the Park
<i>Adonis flammea</i> subsp. <i>flammea</i>	x				x	
<i>Aubrieta columnae</i> subsp. <i>italica</i>		x	x		x	
<i>Biscutella cichoriifolia</i>	x				x	
<i>Callitriche truncata</i> subsp. <i>truncata</i>	x			x	x	
<i>Campanula portenschlagiana</i>		x			x	
<i>Cardamine heptaphylla</i>	x					x
<i>Carlina lanata</i>	x				x	
<i>Ceratophyllum demersum</i>	x				x	
<i>Chaerophyllum magellense</i>	x			x		
<i>Colutea brevilata</i>	x				x	
<i>Draba verna</i> subsp. <i>verna</i>	x				x	
<i>Elodea canadensis</i>		x			x	
<i>Ervilia loiseleurii</i>	x		x		x	
<i>Festuca rubra</i> subsp. <i>juncea</i>	x				x	
<i>Festuca trichophylla</i> subsp. <i>trichophylla</i>	x		x		x	
<i>Filipendula vulgaris</i>	x				x	
<i>Fragaria viridis</i> subsp. <i>viridis</i>	x				x	
<i>Gelasia hirsuta</i>	x				x	
<i>Genista januensis</i> subsp. <i>januensis</i>	x				x	
<i>Helleborus viridis</i> subsp. <i>abruzzicus</i>	x				x	
<i>Heuchera sanguinea</i>		x			x	
<i>Hieracium prenanthoides</i> subsp. <i>prenanthoides</i>	x				x	
<i>Hieracium racemosum</i> subsp. <i>virgaurea</i>	x				x	
<i>Hypparrhenia sinaica</i>	x		x		x	
<i>Lamium bifidum</i> subsp. <i>balcanicum</i>	x				x	
<i>Lathraea squamaria</i>	x				x	
<i>Lycopsis arvensis</i>	x				x	
<i>Lysimachia talaverae</i>	x				x	
<i>Malus florentina</i>	x				x	
<i>Medicago</i> × <i>varia</i>		x			x	
<i>Melampyrum cristatum</i> subsp. <i>cristatum</i>	x				x	
<i>Myriophyllum spicatum</i>	x				x	
<i>Onobrychis alba</i> subsp. <i>pentelica</i>	x		x	x	x	
<i>Papaver apulum</i>	x					x
<i>Papaver argemone</i>	x				x	
<i>Phelipanche schultzei</i>	x		x		x	
<i>Phlomis herba-venti</i> subsp. <i>herba-venti</i>	x				x	
<i>Potamogeton perfoliatus</i>	x				x	
<i>Potamogeton polygonifolius</i>	x					x
<i>Primula veris</i> subsp. <i>columnae</i>	x				x	
<i>Raphanus raphanistrum</i> subsp. <i>raphanistrum</i>	x					x
<i>Rosa nitidula</i>	x				x	
<i>Satureja hortensis</i>		x			x	
<i>Silene cretica</i>	x					x
<i>Silene tenuiflora</i>	x		x		x	
<i>Thalictrum flavum</i>	x				x	
<i>Tilia platyphyllos</i> subsp. <i>platyphyllos</i>	x				x	
<i>Trifolium strictum</i>	x				x	
<i>Triticum biunciale</i> subsp. <i>biunciale</i>	x		x		x	
<i>Verbascum alpinum</i>	x		x		x	
<i>Vicia laeta</i>	x		x		x	
<i>Zammichellia palustris</i>	x				x	

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