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Compilation Article

Checklist of *Alternaria* Species Reported From Turkey

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Abstract:*Alternaria* species are common in nature (*soil, air, plants, animals, etc*) and can saprophytic, endophytic and pathogenic especially in plants. Now, it is difficult to solution all taxonomical problems only by morphological-colonial methods of mentioned genus without molecular studies. According to the current publications, *Alternaria* complex has 9 genera and 23 sections. Number of species is more than 275. The purpose of this study is to document the *Alternaria* species isolated from Turkey with their subtrates and/or habitat. This checklist reviews approximately 132 published findings and presents a list of *Alternaria* species. According to the present publications, 30 *Alternaria* species have been recorded with various subtrates/habitats in Turkey. Among these species, *Alternaria alternata* and *Alternaria citri* species are the most common species reported from Turkey. The other species are *A. arborescens, A. botrytis, A. brassicicola,* A. *burnsii,* A. *cichorii, A. Chlamydospora, A. cheiranthi,* A. *consortialis* [*Ulocladium consortiale*], A. *cookei, A. dianthi, A. ethzedia,* A. *humicola,* A. *humicola, A. infectoria* [*Lewia infectoria*]*, A. longipes, A. mali,* A. *phragmospora* [*Embellisia phragmospora*], *A. petroselini, A. pluriseptata, A. radicina,* A. *raphani,* A. *saponariae,* A. *solani,* A. *tenuis* [*Alternaria alternata*], *A. tenuissima,* A. *triticicola* and A. *zinniae.* The oldest literature is belong to the year of 1948. This study presents information about reported of *Alternaria* species from Turkey in journals covered by *Web of Science* Database and the other journals, books, proceedings, etc. When we use "*Alternaria*" as the key word in Thomson-Reuters *Web of Science* Database in our search between the January 01, 1900 and May 20, 2015; there are 8669 publications and 7345 full texts publications on this subject. 8669 publications contain the following disciplines (top 3): Plant Sciences: 2642, Agriculture: 1686, Biotechnology & Applied Microbiology: 699. These results indicated that there have been many scientific studies about *Alternaria* genus which were increased during the recent years. 2342 publications are done between the years of 2010-2014 and 225 publications were between the December 16, 2014-May 20, 2015.

Key Words: *Alternaria*, biomass, fungal isolation, microfungi, fungal habitats, checklist, Turkey.

Türkiye'den Rapor Edilmiş *Alternaria* Türlerinin Kontrol Listesi

Öz:*Alternaria* türleri doğada (*toprak, hava, bitki, hayvanlar, v.s*) çok yaygındır ve saprofitik, endofitik ve özellikle bitkilerde patojenik olabilirler. Bugün için moleküler çalışmalar olmaksızın bu cinsin sadece morfolojik-koloniyal yöntemlerle tüm taksonomik problemlerini çözmek zordur. Güncel yayınlara göre, *Alternaria* kompleks 9 cins ve 23 seksiyona sahiptir. Tür sayısı 275'den fazladır. Bu çalışmanın amacı, Türkiye'den rapor edilen *Alternaria* türlerinin bir listesini ve izole edildikleri substrat ve/veya habitatları rapor etmektir. Bu kontrol listesi yaklaşık olarak 132 yayınlanmış bulguyu kaynak olarak kullanmış ve *Alternaria* türlerinin bir listesini vermiştir. Mevcut yayınlanmış eserlere göre, 30 *Alternaria* türü Türkiye'deki çeşitli substrat/habitatlardan rapor edilmiştir. Rapor edilen bu türler arasında yer alan *Alternaria alternata* ve *Alternaria citri* en yaygın olanlardır. Diğerleri ise, *A. arborescens, A. botrytis, A. brassicicola,* A. *burnsii* A. *cichorii, A. chlamydospora, A. cheiranthi, A. citri,* A. *consortialis* [*Ulocladium consortiale*], A. *cookei, A. dianthi, A. ethzedia,* A. *humicola,* A. *humicola, A. infectoria* [*Lewia infectoria*], *A. longipes, A. mali,* A. *phragmospora* [*Embellisia phragmospora*], *A. petroselini, A. pluriseptata, A. radicina,*

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A. *raphani,* A. *saponariae,* A. *solani,* A. *tenuis* [*Alternaria alternata*], *A. tenuissima,* A. *triticicola* ve A. *zinniae'*dir. Çalışmada kullanılan en eski literatür 1948 yılına aitdir. Bu çalışma, özellikle *Web of Science* veritabanı kapsamında ve Türkiye adresli olan dergileri, diğer dergileri, kitapları ve kongre bildirilerini dikkate almıştır. 01 Ocak 1900-20 Mayıs 2015 tarihleri arasında, Thomson-Reuters *Web of Science* veritabanında anahtar kelime olarak "*Alternaria*" kullanıldığı zaman, 8669 yayın akrana gelmekte ve bunun 7345'i tam makale olarak görülmektedir. Bu 8669 yayının ilk üçü aşağıdaki bilimsel disiplinlerde yer almaktadır: Bitki bilimleri: 2642; Ziraat: 1686; Biyoteknoloji-Uygulamalı Mikrobiyoloji: 699. Bu sonuçlar, son yıllarda Alternaria cinsi ile ilgili yayınların arttığını göstermektedir. 2010-2014 yılları arasında 2342 yayın ve 16 Aralık 2014-20 Mayıs 2015 arasında ise 225 yayın yapılmıştır.

Anahtar Kelimeler: *Alternaria*, biomass, fungal izolasyon, mikrofungus, fungal habitat, kontrol listesi-checklist, Türkiye.

Introduction

Alternaria species are common in nature (*soil, air, plants, animals, etc*) and can saprophytic, endophytic and pathogenic especially in plants. Some species may cause pathogenic in humans (onycomycosis) (121). Identification of *Alternaria* species are not easy and although taxonomy of *Alternaria* species are generally based on colonial and morphologically, we can not solution all taxonomical problems of *Alternaria* genus via morphological and colonial characteristics. So, we should be use also molecular characteristics of this genus. *Alternaria* complex has 9 genera and 23 sections.

Alternaria was first time described by Nees in 1816 (33). Although Ellis (120) published important book about especially *Alternaria*, *Cladosporium* and *Helminthosporium* genera in 1971, there is no any comprehensive and detailed monograph favour for identification about *Alternaria* Genus until the year of 2007. One of the important manual is published by Simmons in 2007 (34); this book contain 275 *Alternaria* species. Also Simmons published the other articles such as "*Alternaria* themes and variations (106-111) in 1994 (118)"; "Novel dematiaceous hyphomycetes" (119), etc. Also Woudenberg et al. (33)'s study is new and and very important about taxonomy of *Alternaria* that published in 2013. So, we can be found more information about taxonomy of *Alternaria* Genus from Woudenberg et al.'s (33) and Simmon's studies (34). Also Samson et al. (122) described as color illustrations of three *Alternaria* species (*A. arborescens*, *A. infectoria* and *A. tenuissima*) in their study in 2010; but mentioned study is not a *Alternaria* monograph, it is related about important food and indoor fungi. According to the <http://en.wikipedia.org/wiki/Alternaria> internet site, there are 299 *Alternaria* species. The most common media is PDA (Potato dextrose agar) and PCA (potato carrot agar) (122) for growing of *Alternaria* spp.

According to the Woudenberg et al. (33) *Alternaria* complex has 9 genera and 23 sections (*Alternantherae,* Alternata, *Brassicicola, Chalastospora, Cheiranthus, Crivellia, Dianthicola, Embellisia, Embellisioides, Eureka, Gypsophilae, Infectoriae, Japonicae, Nimbya, Panax, Phragmosporae, Porri, Pseudoulocladium, Radicina, Sonchi, Ulocladioides, Ulocladium, Undifilum*).

When we use "*Alternaria*" as the key word in Thomson-Reuters *Web of Science* Database in our search between the January 01, 1900 and May 20, 2015; there are 8669 (*8440 in December 17, 2014*) publications and 7345 full texts (*7156 in December 17, 2014*) publications on this subject. 8669 publications contain the following disciplines (top 3): Plant Sciences: 2642, Agriculture: 1686, Biotechnology & Applied Microbiology: 699. There is interesting result because of Biochemistry & Molecular Biology area was third order in December 16, 2014 but it is 10th order in May 20, 2015! These results indicated that there have been many scientific studies about *Alternaria* genus which were increased during the recent years (2342 publications are done between the years of 2010-2014 and 225 publications were between the December 17, 2014-May 20, 2015).

This study was determined that the 27 *Alternaria* species were reported from Turkey. Preliminary of this work was presented as a poster presentation in Amsterdam (124) in April 2015. There were 13 species in mentioned study. My goal is the document the list of *Alternaria* species reported from Turkey via publications such as journals, boks, proceeding etc.

Methods

The main sources used in this study are *Web of Science* Database and other publications such as journals, books, proceedings etc. Current fungal names are controlled by www.indexfungorum.org and www.mycobank.org internet sites, related books and journals. Accepted names are bold & Italics. Throughout this database, I assume that author(s) properly identified the species reported.

Results

List of Species, Subtrates and/or Habitats, and Citation Numbers of Literature

Alternaria Nees, Syst. Pilze (Würzburg): 72 (1816) [1816-17]; Position in Classification: Pleosporaceae, Pleosporales, Pleosporomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota, Fungi; Type Species: Alternaria *tenuis* Nees, Syst. Pilze (Würzburg): 72 (1816) [1816-17]. It can be see www.indexfungorum.org and Woudenberg et al. (33)'s study for synonym names of *Alternaria* Genus.

Alternaria alternata (Fr.) Keissl. Beih. Bot. Zbl. Abt 2, 29: 434 (1912). [**Air**-Dental unit waterlines and air in Istanbul City (1), hospital air in Edirne City (9), air and soil of vicinity Hamitabat Thermic Power Plant in Kirklareli City (16), urban air of Canakkale City (17), urban air of Adana City (18), indoor and outdoor air of different residential houses in Tekirdag City (21), air of oncology service of medical school hospital of Trakya University, Edirne City (24), air of wood and based board factories (25), indoor air of some homes in Afyon City (27), air of vegetable growing areas of Edirne City (31), indoor air of food production facilities and warehouses in Bursa City (32), indoor air of homes in Erzurum City (44), outdoor air of Elazig City (45), outdoor air of Erzurum City (47), indoor air of neonatal units of hospital in Edirne City (60), indoor air of child day care centers in Edirne City (61), outdoor air of Eskisehir City (62), indoor air of primary schools in Edirne City (63), air of Terkos Lake in Istanbul City (65), indoor air of a hospital in Istanbul City (67), indoor and outdoor air of Balikesir City (68), air and stone, wood, plaster, marble, limestone, brick and paint surfaces in various historical locations in Izmir City (39), Oncology Hospital air of Ege University in Izmir City (69), indoor and outdoor air in the different districts of the city of Istanbul City (109), air of Afyonkarahisar City (114), from the indoor air of homes who live eksogen & alveolitis patients (116), from library boks and indoor air of library in Marmaris, Turkey (126), different units of the indoor air of Department of Internal Diseases, Ege University Hospital in Izmir City (127), indoor and outdoor air of Edirne Selimiye Mosque Library (130); **Soil**-Soil polluted by industrial wastewater in Aydin, Izmir and Manisa cities (22), soil of wheat fields of Kirka Vicinity, Eskisehir City (28), from soil surrounding in cement factory in Gaziantep city (36), from polluted soils in the vicinity of the Erzurum slaughterhouse (37), soil (54), cultivated soil in Eskisehir City (64), soils polluted by Askale (Erzurum) cement work (70), soils of forest, meadow and field in Sarikamis Town (72), soil in Izmir City and Environment (73),soils of the Northeast Anatolia (80), soils of some cultivated fields of Bergama Town (Izmir Province) (86), soils of *Quercus* spp. stands in Belgrad Forest in Istanbul City (92), soils of *Pinus nigra* Arnold. And *Quercus* spp. stands in Belgrad Forest near Istanbul City (93), soils of great Konya Basin (95), agricultural soil in the Ezine (Canakkale) Vicinity (96),

soil fungi flora in burnt and unburnt forest soils in the vicinity of Kargicak (Alanya-Turkey) (97), soil of Cicekli Village-Bornova Town-Izmir City (99), soil of Selcuk University Comaklı Research and Application Farm in Konya City (100), soil that polluted by Caziantep cement plant (101); **Wheat & Barley**-wheat (35, 71, 91), wheat and feed (38), sorghum seed (40), wheat and barley (52), stored wheat (102), barley seed (103), wheat and feed (115); **Bean**-bean in Antakya-Hatay City (8), seed of bean (90), bean seed in Eskisehir City (131); **Other**-on mobile phones of health services vocational school students in Marmaris Town (2), Common Mistletoe-*Viscum album* L. (4), pea (*Pisum sativum* L.) plants growing in Amik plain of Turkey (10), pea (*Pisum sativum*) seeds (11), From Pistachio (13), persimmon fruits in Turkey (14), body surface and intestinal system of caucasian race Bees (*Apis mellifera*) (15), isolated from plant samples such as sunflower, grape, and apple collected from around Erzurum (20), from *Amaranthus* L. (23), body surface of pseudoscorpion (46), fig-apricot-plum-berry (48), home dust (49), bed dust (50), potato and onion (51), some pharmaceutical products (53), wooden-paper-textile-leather-indoor air of Topkapi Museum (55), stored roughage in Van City (58), leaf of pigweed-*Amaranthus retroflexus* (59), pistachio growing in South-East Turkey (66), natural block olives in brine (81), from variety of foods (85), spinach growing fields (87), dried and fresh grape growing in Manisa and Izmir cities (89), *Surface of Lycopersicum esculentum* fruits and their paste growing in Manisa Province (98), packaging meterials of stored surgical strings (106), eye cosmetics (107), baby powders (108), sugar beet seeds (110), corn kernels in the Eastern Black Sea Region (111), on salt used in Turkish leather industry (112), from industrial and home bakeries (113), from cumin (125), from spices in Bursa City (105), tomatoes (*Lycopersicum esculentum* M.) and tomato pastes (129), provided from the collection of the Department of Plant Protection and Department of Food Engineering, Selcuk University (12), habitat and/or substrat are unknown (7, 88, 104, 117, 123)].

Alternaria alternata (Fr.) Keissl., Beih. bot. Zbl., Abt. 2 29: 434 (1912) f. sp. ***citri***. [Isolated from Minneola tangelo in Cukurova Region (41), Citrus species and gardens (56)].

Alternaria arborescens E.G. Simmons, Mycotaxon 70: 356 (1999). [Pistachio growing in South-East Turkey (66)].

Alternaria botrytis (Preuss) Woudenberg & Crous,: 206 (2013). Bas.: __Ulocladium botrytisPreuss1851. [From *Amaranthus* L. (23)].

Alternaria brassicicola (Schwein.) Wiltshire, Mycol. Pap. 20: 8 (1947). [Dental unit waterlines and air in Istanbul City (1), Urban air of Edirne City (26), indoor air of homes in Erzurum City (44), outdoor air of Elazig City (45), outdoor air of Erzurum City (47)].

Alternaria burnsii Uppal, Patel & Kamat, Indian J. agric. Sci. 8: 49 (1938) [From cumin (125)].

Alternaria cheiranthi (Lib.) P.C. Bolle, Meded. Phytopath. Labor. Willie Commelin Scholten Baarn 7: 43 (1924). [Indoor and outdoor air of Edirne Selimiye Mosque Library (130)].

Alternaria chlamydospora Mouch. [as 'chlamydosporum'], Mycopath. Mycol. appl. 50(3): 217 (1973). [Indoor and outdoor air of Edirne Selimiye Mosque Library (130)].

Alternaria cichorii Nattrass, First List of Cyprus Fungi: 29 (1937) [Isolated from *Carthamus tinctorius* , *Plantago lanceolata* (83)].

Alternaria citri Ellis & N. Pierce, Bot. Gaz. 33: 234 (1902). [**Air**-Dental unit waterlines and air in Istanbul City (1), hospital air in Edirne City (9), from air and soil of vicinity Hamitabat Thermic Power Plant in Kirklareli City (Turkey) (16), indoor and outdoor air of different residential houses in Tekirdag City (21), air of oncology service of medical school hospital of Trakya University, Edirne City (24), urban air of Edirne City (26),

indoor air of Trakya University Hospital (30), air of vegetable growing areas of Edirne City (31), indoor air of neonatal units of hospital in Istanbul and Izmir Cities (60), indoor air of child day care centers in Edirne City (61), outdoor air of Eskisehir City (62), indoor air of primary schools in Edirne City (63), air and water of Terkos Lake in Istanbul City (65), Oncology Hospital air of Ege University in Izmir City (69), from the indoor air of homes who live eksogen & alveolitis patients (116), different units of the indoor air of Department of Internal Diseases, Ege University Hospital in Izmir City (127), indoor air of suburban elementary schools in Izmir City (128), indoor and outdoor air of Edirne Selimiye Mosque Library (130); **Other**-from Microbiology Laboratory, Department of Biology, Ataturk University (5), soil fungi flora in burnt and unburnt forest soils in the vicinity of Kargicak (Alanya-Turkey) (97)].

Alternaria consortialis (Thüm.) J.W. Groves & S. Hughes [as 'consortiale'], in Hughes, Can. J. Bot. 31: 636 (1953) (Authors wrote as *Alternaria consortiale*). [***Ulocladium consortiale*** (Thüm.) E.G. Simmons, Mycologia 59 (1): 84 (1967)]. [**Soil**-Soil of cherry garden in Ege University Faculty of Agriculture Izmir City (74), soils of Erzurum and Trabzon cities (77)]

Alternaria cookei (Sacc.) Bremer, Ismen, Karel, Ozkan & M. Ozkan, Monog. Viennue 13: 42 (1948) [Isolated from datura metel (83)].

Alternaria dianthi J.V. Almeida & Sousa da Câmara, Revista Agronômica 1: 59 (1903) [**Air**-Hospital air in Edirne City (9), indoor air of suburban elementary schools in Izmir City (128), indoor and outdoor air of Edirne Selimiye Mosque Library (130); **Other**-isolated from *Dianthus* species (82)].

Alternaria ethzedia E.G. Simmons, Mycotaxon 25 (1): 300 (1986) [Lewia ethzedia E.G. Simmons, Mycotaxon 25 (1): 299 (1986)]. [Canola plant in Thrace Region (132)].

Alternaria humicola Oudem., Arch. néerl. Sci., Sér. 2 7: 292 (1902). [**Soil**-soils of Western part of Anatolia (Alasehir, Cesme, Dinar, Afyon) (75), soils of lichen, moss and grass (76)]
Alternaria humicola Oudem., Arch. néerl. Sci., Sér. 2 7: 292 (1902) var. *gossypii* [Isolated from *Gossypium hirsutum* (83)].

Alternaria infectoria E.G. Simmons, Mycotaxon 25 (1): 298 (1986) [***Lewia infectoria*** (Fuckel) M.E. Barr & E.G. Simmons, in Simmons, Mycotaxon 25 (1): 296 (1986)]. [Renal Transplant Patient (3), from cumin (125)].

Alternaria longipes (Ellis & Everh.) E.W. Mason, Mycol. Pap. 2: 19 (1928). [**Air**-Hospital air in Edirne City (9), from air and soil of vicinity Hamitabat Thermic Power Plant in Kirklareli City (Turkey) (16), indoor air of neonatal units of hospital in Edirne-Istanbul-Eskisehir-Izmir-Manisa Cities (60), indoor air of primary schools in Edirne City (63), isolated from *Capsicum annuum* (83), different units of the indoor air of Department of Internal Diseases, Ege University Hospital in Izmir City (127), indoor air of suburban elementary schools in Izmir City (128), indoor and outdoor air of Edirne Selimiye Mosque Library (130)].

Alternaria mali Roberts, J. Agric. Res., Washington 2: 58 (1914). [Isolated from red jim apple cultivar (6)].

Alternaria phragmospora Emden, Acta bot. neerl. 19(3): 393 (1970) [***Embellisia phragmospora*** (Emden) E.G. Simmons, Mycotaxon 17: 232 (1983)]. [Indoor air of neonatal units of hospital in Istanbul City (60)].

Alternaria petroselini (Neerg.) E.G. Simmons, in Ellis, More Dematiaceous Hyphomycetes (Kew): 417 (1976). [**Air**-Indoor air of child day care centers in Edirne City (61), indoor and outdoor air of Edirne Selimiye Mosque Library (130)].

Alternaria pluriseptata (P. Karst. & Har. ex Peck) Jørst., Meld. Stat. Plantepat. Inst. Oslo 1: 95 (1945). [**Air**-Urban air of Adana City (18), indoor air of food production facilities and warehouses in Bursa City (32), indoor air of homes in Erzurum City (44), outdoor air of Elazig City (45), outdoor air of Erzurum City (47), different units of the indoor air of Department of Internal Diseases, Ege University Hospital in Izmir City (127), indoor air of suburban elementary schools in Izmir City (128), indoor and outdoor air of Edirne Selimiye Mosque Library (130); **Soil**-from soil surrounding in cement factory in Gaziantep city (36), soil that polluted by Gaziantep cement plant (101)].

Alternaria radicina Meier, Drechsler & E.D. Eddy, Phytopathology 12: 157 (1922). [**Air**-Indoor air of some homes in Afyon City (27), indoor air of homes in Erzurum City (44), outdoor air of Erzurum City (47), indoor air of child day care centers in Edirne City (61), indoor and ourdoor air of some homes in Erzurum City (94), indoor air of suburban elementary schools in Izmir City (128); **Other**-soil of wheat fields of Kirka Vicinity, Eskisehir City (28), from industrial and home bakeries (113)].

Alternaria raphani J.W. Groves & Skolko, Canadian Journal of Research, Section C 22: 227 (1944). [**Air**-Urban air of Canakkale City (17), outdoor air of Erzurum City (47), indoor air of child day care centers in Edirne City (61)].

Alternaria saponariae (Peck) Neerg., Aarsber. J.E. Ohlsens Enkes Plantepat. Lab 3: 6 (1938) [1937-1938] [Isolated from *Saponaria officinalis* (83)].

Alternaria solani Sorauer, Z. PflKrankh. PflSchutz 6: 6 (1896). [Tomatoes (42), melon-cucurbita- cucumber (43), fig-apricot-plum-berry (48), surface of tomato growing fields between the Tokat and Turhal (57), leaf of potato (84), substrate and/or habitate are unknown (19, 123)].

Alternaria tenuis Nees, Syst. Pilze (Würzburg): 72 (1816) [1816-17] [Alternaria *tenuis* Link, in Willdenow, Sp. pl., Edn 46 (1): 127 (1824)] [***Alternaria alternata*** (Fr.) Keissl., Beih. bot. Zbl., Abt. 2 29: 434 (1912)]. [Soils of Western part of Anatolia (Cardak) (75), bean (78), rice seed in Denizli, Izmir and Manisa cities (79)]

Alternaria tenuissima (Kunze) Wiltshire, Trans. Br. mycol. Soc. 18 (2): 157 (1933). [**Air**-Hospital air in Edirne City (9), from air and soil of vicinity Hamitabat Thermic Power Plant in Kirklareli City (Turkey) (16), indoor air of Trakya University Hospital (30), indoor air of child day care centers in Edirne City (61), Oncology Hospital air of Ege University in Izmir City (69), air of Afyonkarahisar City (114), different units of the indoor air of Department of Internal Diseases, Ege University Hospital in Izmir City (127), indoor air of suburban elementary schools in Izmir City (128), indoor and outdoor air of Edirne Selimiye Mosque Library (130); **Soil**-Forest soils in Northern Thrace Region (29), soils of some cultivated fields of Bergama Town (Izmir Province) (86), soil of Cicekli Village-Bornova Town-Izmir City (99); **Other**-Cucurbita-cucumber (43), pistachio growing in South-East Turkey (66), natural block olives in brine (81), dried and fresh grape growing in Manisa and Izmir cities (89)].

Alternaria triticicola V. Rao [as 'triticola'], Mycopath. Mycol. appl. 23: 313 (1964). [Indoor air of child day care centers in Edirne City (61)].

Alternaria zinniae M.B. Ellis, Mycol. Pap. 131: 22 (1972 [Alternaria *zinniae* H. Pape, Angew. Bot. 24: 61 (1942)] [Bean (78), isolated from datura metel (83)].

Conclusions

If we consider publications addressed Turkey, *Alternaria alternata* and *Alternaria citri* species are the most common species reported from Turkey. According to the published reports addressed Turkey, there are 30 *Alternaria* species reported from Turkey.

When we consider more than 275 *Alternaria* species, number of 30 species are very less for reported from Turkey. Probably reasons? It is very difficult for answers. There may be many reasons such as lack of species in Turkey, wrong identification, less studies about *Alternaria* genus, the rareness of *Alternaria* expert in Turkey, less of international collaboration between the Turkish and the other researchers etc. This study may contribution to the fungal checklists of Turkey and next studies about *Alternaria* genus.

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