



A COMPREHENSIVE REVIEW ON ETHNOMEDICINAL UTILIZATION OF GYMNOSPERMAE IN TURKEY

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Abstract

Turkey has 40 gymnosperm taxa belonging to 4 families. The ethnomedicinal data of gymnosperms in Turkey was evaluated in this study. Thirty nine ethnobotanical and traditional medicinal published materials which were carried out in different areas of Turkey used in this study. 20 plant taxa belonging to 4 families have been detected from 40 published literature. 20 taxa have recorded for 98 kinds of ethnomedicinal usages and 6 taxa have recorded for ethnoveterinary usages. *Juniperus oxycedrus* subsp. *oxycedrus* was the most common ethnomedicinal plant taxa in Turkey, recorded for 43 different ailments. The others are *Pinus brutia*, *J. drupacea* and *P. nigra* subsp. *pallasiana*. Gymnosperms have been generally used as herbal remedies for the treatment of vulnerary, asthma, bronchitis, ulcer, antiseptic, stomach ache, tuberculosis, gastrointestinal disorders, skin disorders, stomachic, abscess, antirheumatic, cough and diabetes.

Keywords: Ethnobotany, ethnomedicine, gymnosperm, Turkey.

Özet

Türkiye’de doğal olarak yetişen 4 familyaya ait 40 gymnosperm taksonu bulunmaktadır. Bu çalışmada Türkiye’nin farklı bölgelerinde yapılmış 40 etnobotanik ve halk tıbbı çalışması ele alınarak Gymnospermlerin Türkiye’de halk tıbbında kullanımları değerlendirilmiştir. Araştırmada 4 familyaya ait 20 taksonun halk tıbbında kullanıldığı saptanmıştır. Bu 20 takson 98 farklı tedavi yönteminde ve 6 farklı hayvan rahatsızlığında kullanılmıştır. Bu taksonlardan en sık kullanılanı 43 farklı hastalıkta kullanılan *Juniperus oxycedrus* subsp. *oxycedrus*’dur. Diğer sık kullanılan taksonlar ise *Pinus brutia*, *J. drupacea* ve *P. nigra* subsp. *pallasiana*’dır. Gymnospermler genellikle yara iyileştirici olarak, astım, bronşit, ülser, antiseptik, karın ağrısı, verem, sindirim sistemi rahatsızlıkları, deri hastalıkları, midevi, apse, romatizma, soğuk algınlığı ve diyabet gibi çeşitli hastalıklarda halk tarafından kullanılmaktadır.

Anahtar Sözcükler: Açık tohumlu bitkiler, etnobotanik, halk tıbbı, Türkiye.

INTRODUCTION

Turkey has an impressive rich flora and a great knowledge of folkloric medicines and consequently represents a potential resource for ethnomedicinal studies. There are 8796 species in Flora of Turkey (excluding an additional 192 species of The East Aegean Islands) (Davis 1965-1985, Davis et al. 1988, Güner et al. 2000). According to the last checklist, an additional 945 species were added flora of Turkey (Özhatay et al. 2013). The rate of endemism is about %34 in the flora of Turkey (Davis 1965).

The majority of Turkish people living in rural areas traditionally use plants for different purposes. Studies in Turkey on ethnomedicine have gradually developed since 1945 (Baytop 1999). In recent years, the traditional use of plants for medical purposes has drawn the attention of researchers in our country as well (Kendir ve Güvenç 2010).

Forests cover 27.7% of the area in Turkey and Gymnospermae forests cover 60% of forest area. The total forest area covered by Gymnospermae taxa is given Table 1. There are 40 Gymnosperm taxa belonging to 4 families naturally grown in Turkey (Yaltırık and Akkemik 2011). Gymnosperm taxa have an important value about ethnomedicine.

Table 1. Total area covered by Gymnosperm forests in Turkey (Yaltırık and Akkemik 2011).

Taxon name	Area covered
<i>Pinus brutia</i>	5.400.000 ha
<i>P. nigra</i>	4.200.000 ha
<i>P. sylvestris</i>	1.200.000 ha
<i>Abies</i> sp.	600.000 ha
<i>Juniperus</i> sp.	500.000 ha
<i>Cedrus libani</i>	400.000 ha
<i>Picea orientalis</i>	300.000 ha
<i>Pinus pinea</i>	≤100.000 ha
<i>Pinus halepensis</i>	≤10.000 ha
<i>Cupressus sempervirens</i>	≤10.000 ha
<i>Taxus baccata</i>	≤10.000 ha

There are many rural areas inside or close to Gymnosperm forests in Turkey so there are different kind of uses Gymnosperm taxa by local people (Kızılarşlan and Sevgi 2013). The aim of this study is to show the richness of ethnomedicinal uses of Gymnosperm taxa in Turkey.

MATERIAL AND METHODS

Thirty nine ethnobotanical and traditional medicinal published materials which were carried out in different areas of Turkey used in this study (Abay and Kılıç 2011, Akaydın et al. 2013, Akyol and Altan 2013, Altundağ and Öztürk 2011, Arı et al. 2015, Bağcı 2000, Baytop 1999, Çakılcoğlu et al. 2011, Demirci and Özhatay 2012, Erol and Tuzlacı 1999, Ertuğ 2002, Everest and Öztürk 2005, Güzel et al. 2015, Han and Bulut 2015, Hayta et al. 2014, Kültür 2008, Özçelik 1987, Özdemir and Alpınar 2015, Özgökçe and Özçelik 2004, Özhatay et al. 2006, Özkan and Koyuncu 2005, Sadıkoğlu and Alpınar 2001, Sargın 2015, Sargın et al. 2013, Sargın et al. 2015a, Sargın et al. 2015b, Sayar et al. 1995, Sezer and Avcı 2004, Sezik et al. 1997, Şenkardeş and Tuzlacı 2014, Tetik et al. 2013, Uğulu et al. 2009, Uysal et al. 2010, Vural et al. 1997, Yazıcıoğlu and Tuzlacı 1995, Yeşilada 1995, Yeşilada et al. 1993, Yeşilyurt et al. 2017a, Yeşilyurt et al. 2017b). Scientific plant names were checked by using the website of Plant List (www.theplantlist.org). No papers has come out with ethnomedicinal uses of Gymnosperms in Turkey.

RESULTS AND DISCUSSIONS

20 plant taxa belonging to 4 families have been detected from thirty nine published literature (Abay and Kılıç 2011, Akaydın et al. 2013, Akyol and Altan 2013, Altundağ and Öztürk 2011, Arı et al. 2015, Bağcı 2000, Baytop 1999, Çakılcoğlu et al. 2011, Demirci and Özhatay 2012, Erol and Tuzlacı 1999, Ertuğ 2002, Everest and Öztürk 2005, Güzel et al. 2015, Han and Bulut 2015, Hayta et al. 2014, Kültür 2008, Özçelik 1987, Özdemir and Alpınar 2015, Özgökçe and Özçelik 2004, Özhatay et al. 2006, Özkan and Koyuncu 2005, Sadıkoğlu and Alpınar 2001, Sargın 2015, Sargın et al. 2013, Sargın et al. 2015a, Sargın et al. 2015b, Sayar et al. 1995, Sezer and Avcı 2004, Sezik et al. 1997, Şenkardeş and Tuzlacı 2014, Tetik et al. 2013, Uğulu et al. 2009, Uysal et al. 2010, Vural et al. 1997, Yazıcıoğlu and Tuzlacı 1995, Yeşilada 1995, Yeşilada et al. 1993, Yeşilyurt et al. 2017a, Yeşilyurt et al. 2017b). The

ethnomedicinal uses of these taxa with their family names, local names, used parts and usage

methods are presented in Table 2 in an alphabetical order.

Table 2. List of Gymnosperms used as ethnomedicine in Turkey

Scientific name&Family name	Local names	Used parts	Ailments treated
<i>Abies cilicica</i> (Ant.&Kotschy) Carr. subsp. <i>cilicica</i> (Pinaceae)	gatron (25), göknar (37), iladin (6, 23, 25, 36, 37), iledin (23), kanak (6), katran (25), köknar (36, 37), köknar sakızı (7), ladin (23), mezda, mezdeği (7, 9), mezda sakızı, mezla (9)	cone	antiseptic, cold, flu, menstrual pain (9), gastrointestinal diseases, pyrosis, reflux, ulcer, asthma, bronchitis (23)
		fruit	cardiovascular system disorder (36)
		resin	ulcer (6, 9, 23, 36, 37), stomach ache (6, 9), bronchitis (23, 36), gastrointestinal diseases, pyrosis, reflux, asthma (23), stomach ache, digestive, abdominal pain of livestock (25), tuberculosis, abscess (36), kidney stone (37)
		shoot	vulnerary (36)
		tar	antiseptic, abscess (7), vulnerary (36)
<i>Abies cilicica</i> (Ant.&Kotschy) Carr. subsp. <i>isaurica</i> Coode&Cullen (Pinaceae) Endemic!	gatron (25), göknar (17, 30), iladin (23, 25), iledin (23), katran (25), köknar (7), ladin (17, 23, 30), mezda, mezdeği (7)	cone	gastrointestinal diseases, pyrosis, reflux, ulcer, asthma, bronchitis (23)
		resin	gastrointestinal diseases (23, 30), pyrosis, reflux, ulcer, asthma, bronchitis (23), skin disorder, stomachic (17), stomach ache, digestive, abdominal pain of livestock (25)
		tar	antiseptic, abscess (7), stomach ache, digestive, abdominal pain of livestock (25)
<i>Abies nordmanniana</i> (Steven) Spach. (Pinaceae)	köknar (4, 7, 29), ladin (29)	leaf	expectorant, costiveness (7)
		tar	vulnerary (4, 7, 29), antiseptic (7), maturation of abscess (29)
<i>Cedrus libani</i> A.Rich. (Pinaceae)	kamalak (7, 36), katran ağacı (7, 23, 36), sedir (15, 23), sedir ağacı (7, 23, 36)	branch	abdominal pain (15)
		resin	gastrointestinal diseases, pyrosis, reflux, ulcer (23), fistulas on hand /foot (36)
		root	diabetes (36)

		stele	gastrointestinal diseases, pyrosis, reflux, ulcer (23)
		tar	antiparasitic for livestock (7), gastrointestinal diseases, pyrosis, reflux, ulcer (23), abdominal pain, diarrhea, antirheumatic, to cure infertility in women, to treat snake or scorpion bite, bronchitis, cold, to treat fissure (36)
<i>Cupressus sempervirens</i> L. (Cupressaceae)	katran ağacı (17), kobelek (39), servi, selvi, yılbaşı ağacı (24, 26), zelve (38)	bark	toothache, foot odor, wart, and corn treatment (26)
		cone	wart treatment, toothache (24), stomach ache, cough (39)
		cupula	toothache, foot odor, wart, and corn treatment (26)
		fruit	fungal infection (38)
		resin	skin disorder, respiratory system disorder (17), toothache, foot odor, wart, and corn treatment (26)
<i>Ephedra campylopoda</i> C.A.Meyer (Ephedraceae)	deniz üzümü (7)	branch	sudorific, antirheumatic (7)
<i>Ephedra major</i> Host (Ephedraceae)	alyanak, deniz üzümü (7)	branch	sudorific, antirheumatic (7)
		fruit	asthma (7)
<i>Juniperus communis</i> L. (Cupressaceae)	ardıç (7)	cone	diuretic, antiseptic, stomachic, sudorific (7)
<i>Juniperus drupacea</i> Labill. (Cupressaceae)	andız (7, 9, 11, 12, 17, 23, 25, 36, 37), andız gılığ (36), ardıç, ardıçgeliğ (36), ardıçgılığ (37), aygılığ (30), dikenli andız (37), pıt andız, selbandız, selbi andız (23)	cone	asthma (9, 23, 25, 30), bronchitis (9, 23, 25), cold, cough (9, 23), hypercholesterolemia (30), gastrointestinal diseases, enuresis (23), tonic, aphrodisiac, anthelmintic (7)
		fruit	asthma (9, 12, 23), cold, cough, bronchitis (9, 23), stomach ache (36, 37), enuresis (12, 23), arthrosis, tuberculosis, cardiogenic, emmenagogue, antirheumatic, aphrodisiac (12), flu, gastrointestinal diseases (23), anthelmintic (37)
		gall	diuretic, prostrate (11)
		seed	asthma (9, 12, 23), cold, cough, bronchitis (9, 23), bed-wetting, arthrosis, tuberculosis, cardiogenic, emmenagogue,

			antirheumatic, aphrodisiac (12), gastrointestinal diseases, enuresis (23)
		shoot	urethritis, gout (37)
		tar	diarrhea (36), antirheumatic, skin disorder, anti-hemorrhoidal (17), respiratory system disorder, urethritis, scabies of livestock (7)
<i>Juniperus excelsa</i> M.Bieb. (Cupressaceae)	andız (23), ardıç (2, 4, 31, 8), çitandız (25), kara ardıç giliği (36), katran ağacı (5)	fruit	cough (2, 36), anti-hemorrhoidal (4), diabetes, asthma (2)
		resin	bronchitis (25)
		seed	kidney stone (8), vulnerary (31)
		shoot	gastrointestinal diseases (23)
		stele	gastrointestinal diseases (23)
		stem	digestive, antiseptic (5)
<i>Juniperus foetidissima</i> Willd. (Cupressaceae)	ardıç (23, 25), kara ardıç (10), kokar ardıç (27), kokar ardıcı (5), kokar ardıç (27), sakız ardıcı, sakızlı ardıç (23), yağ ardıcı (10)	cones	stomach ache, diabetes, arthrosis (10)
		leaf	skin disorder, warts (5)
		resin	vulnerary, diabetes (23), stomach ache, hypertension (25)
		shoots	diuretic (27)
<i>Juniperus oxycedrus</i> L. subsp. <i>oxycedrus</i> (Cupressaceae)	ardıç (11), ardıç (3, 11, 13, 14, 17, 20, 22-25, 32, 33, 38), ardıç giliği (36, 37), ardıçkatranı (16, 20), ardıç üzümü (28, 38), cicamuk, çıtımık (21), diken ardıcı (10), diken ardıç giliği (36), dikenli ardıç (4, 19, 36, 37), giliği (5), katran ardıcı (7, 18), kokar ardıç (34), menengiç (21), pıtık ardıcı (7), tafrun (13), tiken ardıcı (36), tikenardıç, tikenli ardıç (25)	bark	cancer (3)
		branch	skin disorder, eczema (18), injure treatment (33)
		cone	prostrate, chest pain (23), stomachic (20), stomach ache (10, 14), kidney stone, asthma, cold, bronchitis, ulcer, tuberculosis (10), cholesterol (5), diabetes (5, 10), cough (9, 10, 22)
		fruit	anti-hemorrhoidal (28, 36, 37, 38), antirheumatic (4, 19, 24), cough (4, 32, 36), cold (23-25, 36), diuretic (23, 25, 32), bronchitis (23, 25, 36), asthma (21, 24), stomachic (32, 34), stomach ache (25, 36), gastrointestinal disorder (23, 25), gall bladder disorder (24, 28), antiparasitic (4), cystitis (13), diabetes

			(38), blood depurative, enteralgia, menstrual regulatory, sudorific, antiseptic, expectorant (32), abdominal pain, diarrhea, anal fistula, amenorrhea, catarrh, urethritis (36), kidney stone, bloating (37)
		leaf	bronchitis, cold, flu, diuretic, gastrointestinal disorder (23), cholesterol (5), diabetes (5, 10), injure treatment (33)
		resin	vulnerary (37)
		root	stomach ache (36)
		seed	bronchitis, cold, flu, diuretic, gastrointestinal disorder (23), anti-hemorrhoidal (20)
		stem	skin disorder, eczema (18), injury treatment (33)
		tar	asthma (24, 36), antirheumatic (4, 24), antiparasitic (4), scabies of livestock (7), psoriasis (9), antiseptic (11), eczema, inflamed wound, vulnerary (16), skin disorder (20), gallstone (24), scabies (34), cold, cough, anal fistula (36)
<i>Juniperus phoenicea</i> L. (Cupressaceae)	ardeş, ardıç (11)	fruit	abdominal pain, diarrhea, kidney stone (11)
		shoot	abdominal pain (11)
<i>Juniperus sabina</i> L. (Cupressaceae)	kara ardıç (7)	leaf	miscarry, diuretic, menstrual regulatory (7)
<i>Picea orientalis</i> (L.) Peterm. (Pinaceae)	-	-	peptic ulcer, intestinal parasitic diseases, tuberculosis, pneumonia, lung abscess, burn, eczema (35)
<i>Pinus brutia</i> Ten. (Pinaceae)	çam (2, 11, 23-26, 30, 37), çam ağacı (25, 26, 23), kızılçam (1, 7, 9, 10, 23-27, 32, 36), kızıl kabuklu çam (23, 26), sorkunç (23, 25)	bark	diabetes, bronchitis, asthma, tuberculosis, cancer (24, 26), disinfection, spleen pain, carminative, costiveness, intestinal spasm, dyspepsia (26), liver spots, pyrosis, reflux, ulcer, gastrointestinal disorder, lumbago, abscess, intertrigo (23), pneumonia (23, 37)
		bud	diuretic, expectorant, cough (7)

		cone	stomachic, intestinal regulatory (1), cough, lung diseases, hoarse (10), bronchitis (10, 24), asthma (10, 24, 26), diabetes (11, 24, 26), tuberculosis, cancer (24, 26), intestinal pain, gastrointestinal spasm (23, 25, 26), disinfection, spleen pain, bronchitis, carminative, costiveness, dyspepsia (26), liver spots, pneumonia, pyrosis, reflux, ulcer, lumbago, abscess, intertrigo (23), stomach ache (25, 32)
		fruit	bronchitis, stomach ache, cough (2), diarrhea (37)
		leaf	bronchitis (2), diabetes (11), asthma (32)
		resin	bronchitis, asthma (10, 24, 26), cough (11, 36), diabetes, tuberculosis, cancer (24, 26), waist pain (10), liver spots, pneumonia, pyrosis, reflux, ulcer, gastrointestinal disorder, lumbago, abscess, intertrigo (23), disinfection, spleen pain, carminative, costiveness, intestinal spasm, dyspepsia (26), vulnerary (30), cold (36)
		stete	liver spots, pneumonia, pyrosis, reflux, ulcer, gastrointestinal disorder, lumbago, abscess, intertrigo (23), tonic, tuberculosis (7)
		stem	stomach ache, tuberculosis (9), antiseptic (10, 27), respiratory system disorder (27)
		tar	tuberculosis (9, 24, 26), diabetes, bronchitis, asthma, (24, 26), vulnerary (9, 30), cancer (24, 26), vulnerary (7), stomach ache (9), disinfection, spleen pain, carminative, costiveness, intestinal spasm, dyspepsia (26), scabies, acarid repellent (30), bloating, diarrhoea (37)
<i>Pinus nigra</i> Arnold. subsp. <i>pallasiana</i> (Lamb.)	çam (8, 17), fesleğen çamı, fesleğan çamı (24), karaçam (7, 13, 28, 36), katran çamı (5), kozalak (38), top çamı (24)	bark	diarrhea (36)

Holmboe. (Pinaceae)		branch	cold, flu, psoriasis (8)
		cone	cough (13), skin disorder, stoamachic (17), bronchitis (38)
		fruit	internal diseases (36)
		leaf	cold, flu, psoriasis (8)
		resin	cold, flu (8, 36), psoriasis (8), bronchitis (14), skin disorder, stomachic (17), diabetes, hypercholesterolemia, asthma, antirheumatic (24), abscess, cough, gastric ulcer, peptic ulcer, burn, erysipelas (36)
		stem	antiseptic (5)
		tar	vulnerary (7), diabetes, hypercholesterolemia, asthma, rheumatism (24), wart, clavus (28), abdominal pain, diarrhea, reduce swelling snake or scorpion bites, vulnerary, abscess, cold (36)
<i>Pinus pinea</i> L. (Pinaceae)	çam fıstığı (7, 13), fıstık çamı (12, 32), küner çamı (11)	bark	lactagogue, tuberculosis, mnemasthenia, anodyne, expectorant, anti-hemorrhoidal, vulnerary (12)
		seed	tonic (7), lactagogue, tuberculosis, mnemasthenia, anodyne, expectorant, anti-hemorrhoidal, vulnerary (12), semen enhancer (13),
		shoot	asthma, bronchitis (11), lactagogue, tuberculosis, mnemasthenia, anodyne, expectorant, anti-hemorrhoidal, vulnerary (12)

		tar	lactagogue, tuberculosis, mnemasthenia, anodyne, expectorant, anti-hemorrhoidal (12), vulnerary (12, 32)
<i>Pinus sylvestris</i> L. (Pinaceae)	çam (16, 21, 31), çam akması (16), sarıçam (4, 7, 13, 29)	bud	pneumonia (16)
		cone	expectorant (31), cough (21), bronchitis, pneumonia, (35)
		leaf	asthma (16)
		resin	cough, expectorant, antiseptic (7), sore throat (16), vulnerary (16, 21)
		shoot	cough, pertussis (13), asthma (16)
		stem	panacea, tuberculosis (29)
		tar	vulnerary (4, 29), snake bites, panacea, tuberculosis (4), abscess, snake bite (29), burn, vulnerary (35)
<i>Taxus baccata</i> L. (Taxaceae)	ardıç (22), kadım ağacı (7), porsuk (22, 7), püren ağacı (7)	arillus	antirheumatic (22)
		leaf	sedative, stomachic, carminative (7)

Recorded literature uses: (1) Abay and Kılıç 2011, (2) Akaydın et al. 2013, (3) Akyol and Altan 2013, (4) Altundağ and Öztürk 2011, (5) Arı et al. 2015, (6) Bağcı 2000, (7) Baytop 1999, (8) Çakılçoğlu et al. 2011, (9) Demirci and Özhatay 2012, (10) Erol and Tuzlacı 1999, (11) Ertuğ 2002, (12) Everest and Öztürk 2005, (13) Güzel et al. 2015, (14) Han and Bulut 2015, (15) Hayta et al. 2014, (16) Kültür 2008, (17) Özçelik 1987, (18) Özdemir and Alpınar 2015, (19) Özgökçe and Özçelik 2004, (20) Özhatay et al. 2006, (21) Özkan and Koyuncu 2005, (22) Sadıkoğlu and Alpınar 2001, (23) Sargın 2015, (24) Sargın et al. 2013, (25) Sargın et al. 2015a, (26) Sargın et al. 2015b, (27) Sayar et al. 1995, (28) Sezer and Avcı 2004, (29) Sezic et al. 1997, (30) Şenkardeş and Tuzlacı 2014, (31) Tetik et al. 2013, (32) Uğulu et al. 2009, (33) Uysal et al. 2010, (34) Vural et al. 1997, (35) Yazıcıoğlu and Tuzlacı 1995, (36) Yeşilada 1995, (37) Yeşilada et al. 1993, (38) Yeşilyurt et al. 2017a, (39) Yeşilyurt et al. 2017b).

20 taxa have recorded for 98 kinds of ethnomedicinal usages (Figure 1) and 6 taxa have recorded for ethnoveterinary usages (Figure 2). *J. oxycedrus* subsp. *oxycedrus* is the most common ethnomedicinal plant taxa in Turkey. It was recorded for 43 different ailments (Akyol and Altan 2013, Altundağ and Öztürk 2011, Arı et al. 2015, Baytop 1999, Erol and Tuzlacı 1999, Ertuğ 2002, Güzel et al. 2015, Han and Bulut 2015, Özçelik 1987, Özdemir and Alpınar 2015, Özgökçe and Özçelik 2004, Özhatay et al. 2006, Özkan and Koyuncu 2005, Sadıkoğlu and Alpınar 2001, Sargın 2015, Sargın et al. 2013, Sargın et al.

2015a, Sezer and Avcı 2004, Uğulu et al. 2009, Uysal et al. 2010, Vural et al. 1997, Yeşilada 1995, Yeşilada et al. 1993, Yeşilyurt et al. 2017a). The others are *P. brutia* was used for 39 (Abay and Kılıç 2011, Akaydın et al. 2013, Baytop 1999, Demirci and Özhatay 2012, Erol and Tuzlacı 1999, Ertuğ 2002, Sargın 2015, Sargın et al. 2013, Sargın et al. 2015a, Sargın et al. 2015b, Sayar et al. 1995, Şenkardeş and Tuzlacı 2014, Uğulu et al. 2009, Yeşilada 1995, Yeşilada et al. 1993), *J. drupacea* was used for 25 (Baytop 1999, Demirci and Özhatay 2012, Ertuğ 2002, Everest and Öztürk 2005, Özçelik 1987, Sargın 2015, Sargın et

al. 2015a, Şenkardeş and Tuzlacı 2014, Yeşilada 1995, Yeşilada et al. 1993) and *P. nigra* subsp. *pallasiana* was used for 24 different ailments (Ari et al. 2015, Baytop 1999, Çakılcoğlu et al. 2011,

Güzel et al. 2015, Özçelik 1987, Sargin et al. 2013, Sezer and Avcı 2004, Yeşilada 1995, Yeşilyurt et al. 2017a) (Figure 1).

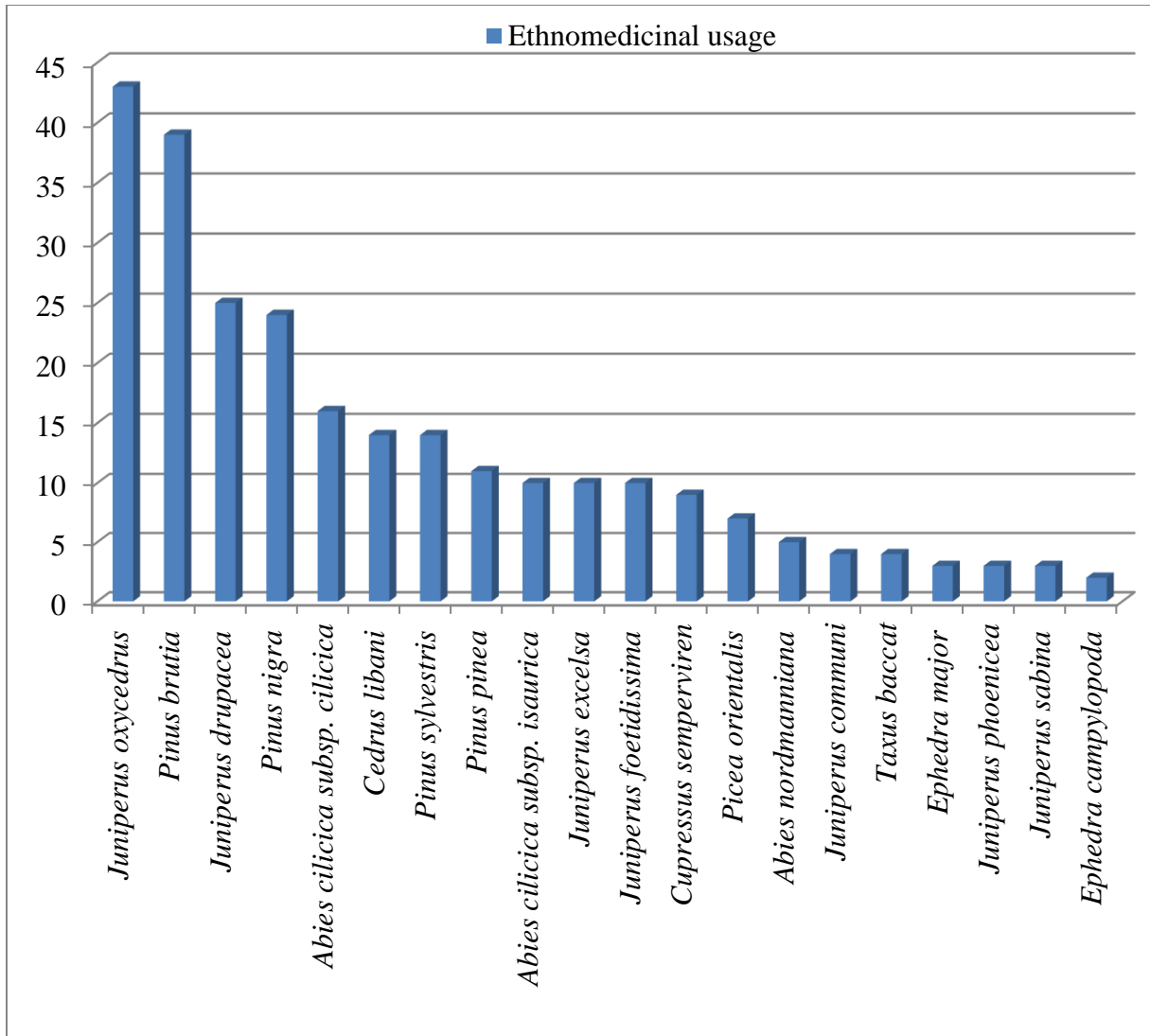


Figure 1. Record numbers of Gymnosperm taxa used as ethnomedicine

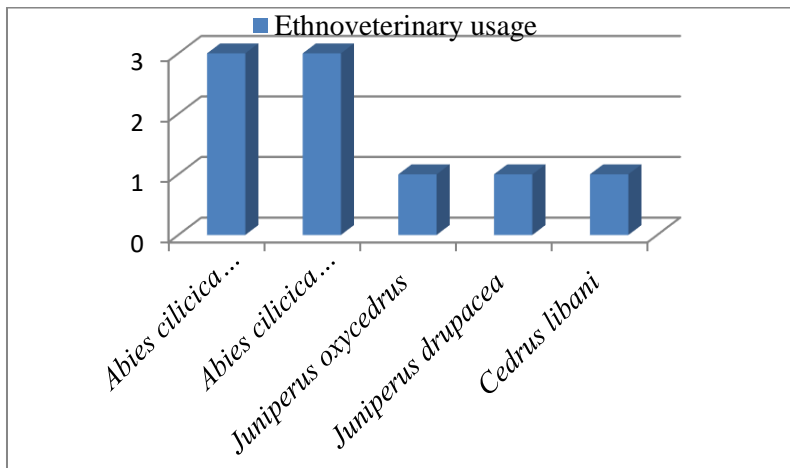


Figure 2. Record numbers of Gymnosperm taxa for ethnoveterinary usages

The most common medicinal plant families were Pinaceae (45%), Cupressaceae (40%) and Ephedraceae (10%). *Abies cilicica* subsp. *isaurica* is the only endemic taxon used for medicinal purposes.

The plant parts most commonly used for the preparation of remedies were tar (12.8%), cone (11.6%), resin (11.6%), fruits (11.6%), stem

(10.5%), leaves (9.3%), shoots (8.2%) and other parts (24.4%).

Gymnosperms have been generally used as herbal remedies for the treatment of vulnerary, asthma, bronchitis, ulcer, antiseptic, stomach ache, tuberculosis, gastrointestinal disorders, skin disorders, stomachic, abscess, antirheumatic, cough and diabetes (Figure 3).

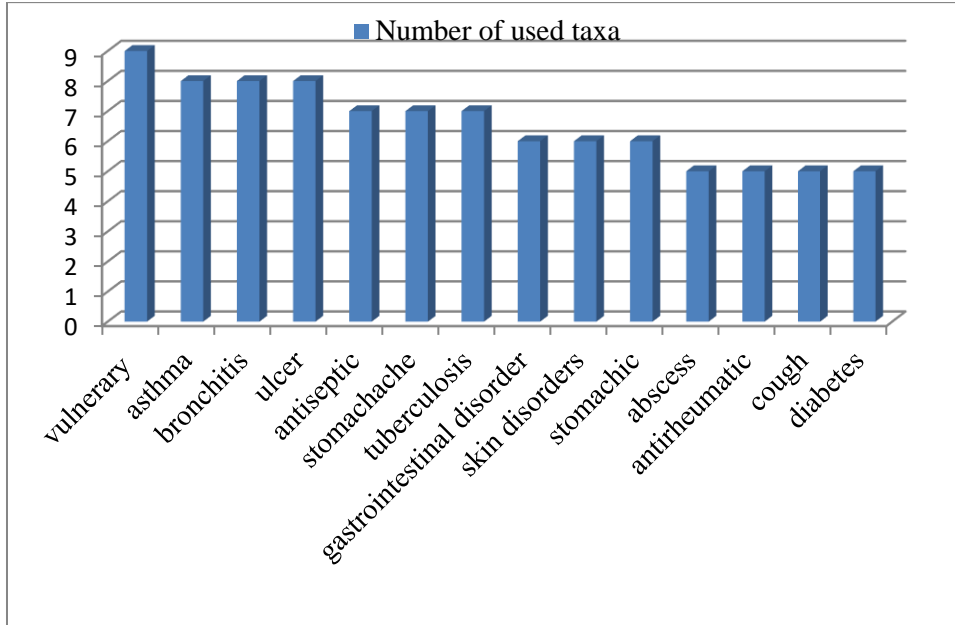


Figure 3. The most frequent types of medicinal use records

CONCLUSIONS

Gymnosperms are not threatened because of using as ethnomedicine in Turkey. Especially *Pinus* forests are kept control by the provincial organization of Turkish Ministry of Forestry and Waterworks (Kızılarşlan and Sevgi 2013). Furthermore, Turkey has a great diversity of ethnomedicinal uses of Gymnosperms for many kinds of ailments and this study provides the opportunity to evaluate valuable information about Gymnosperms used in folk medicine in Turkey.

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Submitted: 13.04.2017

Accepted: 02.06.2017