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Road-side Trees and Shrubs in Saudi Arabia alongside the Abha-Taif Motorway

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Abstract. The Abha-Taif motorway is 1275 km long and rises to 1500-2250 m a.s.l. The scenery along this route is varied as parts of it face the moisture-laden winds while other parts are on the rain-shadow. The route transacts vegetational belts which have been studied at 45 locations. The numerous cities, towns and villages along the motorway have had, as expected, significant detrimental impact on the vegetation. This study serves as a base line study for comparisons at a future time to record changes in vegetation that may occur.

Introduction

The Abha-Taif motorway is 1275 km long and rises to 1500-2250 m a.s.l., (Fig. 1) with several side-descents to the warmer coastal areas of the Red Sea.

Several reports are published on this stretch (1,2,3,4,5,6,7,8,9,10,11 and 12). The present study deals with this route, commonly referred to as the southern route. The ecological impact of cities, towns and villages on the vegetation is referred to. The main aim of the exercise is to provide interested students, academics, and tourists with a list of named taxa observed on the road side.

Methods

The motorway is divided into two parts: (a) The Abha-Al-Baha section, whichis passing through an area facing the moisture-laiden winds, rising to 2400 m.a.s.l. and (b) the Al-Baha-Al-Taif section which passes through some areas facing moisture laiden winds as well as other areas on the rain-shadow, rising to C. 1700 m.a.s.l.

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The car drive along the motorway was set at low speed to allow for frequent stoppages to collect, record and photograph plants. The total distance was divided into locations (1-to-4) in a manner of ascent (or descent) of 100 m intervals using an altimeter. At the same time, and by use of the car speed the horizontal odometer between one location and the next was recorded. In total, 45 locations were studied (Fig. 1). Of these, 30 fall between Abha and Al-Baha and 15 along Al-Baha-Al-Taif route.

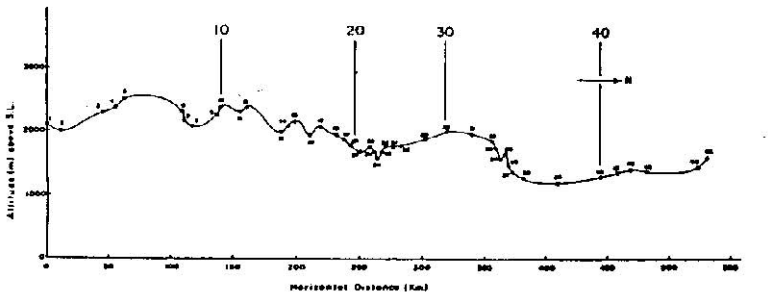

Fig. 1. Abha–Taif motorway (locations 1-45).

Wild plants are mentioned in the order in which they were recorded on sight. Attempts were made to collect as much plant specimens as possible. Plant identification was based on the works of Baierle *et al.* [5] Collenette [9] and Migahid [12]. All herbarium specimens are kept in the Department of Botany and Microbiology, College of Science, King Saud University.

An alphabetical list of taxa recorded along the motorway is given in Appendix 1. Taxa known to occur in the area, but did not fall within the locations studied, are also given in Appendix 2.

Results

(a) The Abha-Al-Baha motor

Location 1: Abha city (2100 m.a.s.l.)

Juniperus excelsa, Acacia gerrardii, Solanum incanum, Capparis cartilagenea, (Fig. 2), *Rumex nervosus, Ficus populifolia, F. salicifolia,* and *Adenium obesum.*

Almost all wadis are converted to small agricultural plots fenced with *Opuntia ficus-indica.* Several of these plots appear deserted or neglected. Their place was probably once occupied by *Juniperus excelsa* and other wild trees and shrubs.

Location 2: (2000-2100 m a.s.l.; 11 km to the north of Abha).

Fig. 2. ***Capparis cartilagenea*** **Decne.**

The same taxa as in location 1, with the addition of *Caralluma russueliana,* (Fig. 3), *C. penicillata, Tarchonanthus camphoratum, barleria bispinosa, Nuxia congesta, Cornulaca monacantha,* and *Aerva lanata.*

This location is suburban to Abha and several small gardens are seen in the wadis.

Location 3: (2250 m a.s.l.; 45 km north of Abha; and location 4 (2350 m a.s.l.) 56 km north of Abha.

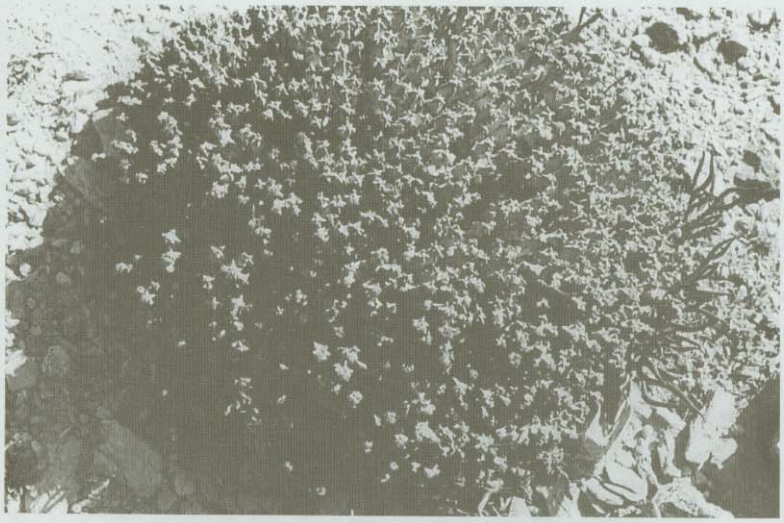

Fig. 3. ***Caralluma russueliana*** **(Courb. ex Brongn.) Cufod.**

Both location reflect old terrace-cultivation practices on mountain sides with few scattered *Juniperus excelsa* and *Acacia gerrardii* trees, left.

Location 5: (2450 m a.s.l.), 59 km north of Abha). The following taxa are seen:

Juniperus excelsa, Acacia gerrardii, Dodonaea viscosa, Rhamnus oleoides, and *Psiadia punctulata.*

Locations 6: (2250 m a.s.l.); 88 km north of Abha);

7: (2150 m a.s.l.), 89 km north of Abha).

Several villages occupy these two sites where active farming and gardening is going on with some of the products displayed by the road side. Few trees of *Juniperus excelsa, Acacia gerrardii,* and *Ficus vasta* are seen.

Location 8:)2050 m a.s.l.; 96 km north of Abha and the site of Tanumah Falls, the popular tourist attraction).

The falls are protected by *Juniperus excelsa, Acacia gerrardii, Ficus vasta, F. salicifolia,* and *Rhamnus oleoides,* while the small pool contains some aquatic flowering plants and ferns and on the steep walls are also seen some ferns and several lichens.

Location 9: (2250 m a.s.l.; 137 km north of Abha).

Acacia gerrardii, Juniperus excelsa, Ficus populifolia, Dodonaea viscosa, (Fig. 6), *Rumex nervosus* (Fig. 4) and *periploca aphylla.*

Fig. 4. *Rumex nervosus* Vahl.

Location 10: (2350 m a.s.l.; 138 km north of Abha and the site of Al-Nimas city).

Several farms are seen in the wadis with few scattered *Acacia gerrardii* trees but no *Juniperus excelsa* was seen. Apparently most of the Juniper tree elements were destroyed for building, fuel or for some agricultural purposes.

Locations 11: (2250 m a.s.l.; 156 km north of Abha), and

12: (2350 m a.s.l.; 161 km north of Abha), and

13: (2000 m a.s.l.; 189 km north of Abha).

Acacia gerrardii, Juniperus excelsa, Ficus populifolia, Rumex nervosus, (Fig. 4), *Rhamnus oleoides,* and *Psiada punctulata.*

Mountain sides reflect signs of past terrace cultivation.

Locations 14: (2070 m a.s.l.; 193 km north of Abha), and

15: (2170 m a.s.l.; 199 km north of Abha).

Acacia gerrardii, Juniperus excelsa, Ficus populifolia, and *Rhamnus oleoides.*

Location 16: (1970 m a.s.l.; 210 km north of Abha and the site of a village with some scattered agricultural plots).

Few *Juniperus excelsa* and *Acacia gerrardii* trees were seen.

Locations 17: (2070 m a.s.l.; 228 km north of Abha), and

18: (1970 m a.s.l.; 233 km north of Abha).

Both locations are occupied by villages. Most important here is the appearance of *Olea chrysophylla* with *Acacia gerrardii, Ficus salicifolia* (Fig. 5), *Dodonaea viscosa* (Fig. 6), and *Rumex nervosus.*

Locations 19: (1870 m a.s.l.; 238 km north of Abha), and

20: (1770 m a.s.l.; 242 km north of Abha), and

21: (1670 m a.s.l.; 253 km north of Abha), and

22: (1770 m a.s.l.; 259 km north of Abha), and

23: (1670 m a.s.l.; 262 km north of Abha), and

24: (1570 m a.s.l.; 263 km north of Abha), and

25: (1670 m a.s.l.; 267 km north of Abha), and

26: (1670 m a.s.l.; 269 km north of Abha), and

27: (1770 m a.s.l.; 277 km north of Abha), and

Fig. 5. ***Ficus salicifolia*** **Vahl.**

28: (1670 m a.s.l.; 278 km north of Abha), and

All these locations still have *Olea chrysophylla* as well as *Ficus populifolia, Rhamnus oleoides, Euphorbia fractiflexa, Rumex nervosus, Dodonaea viscosa* and few

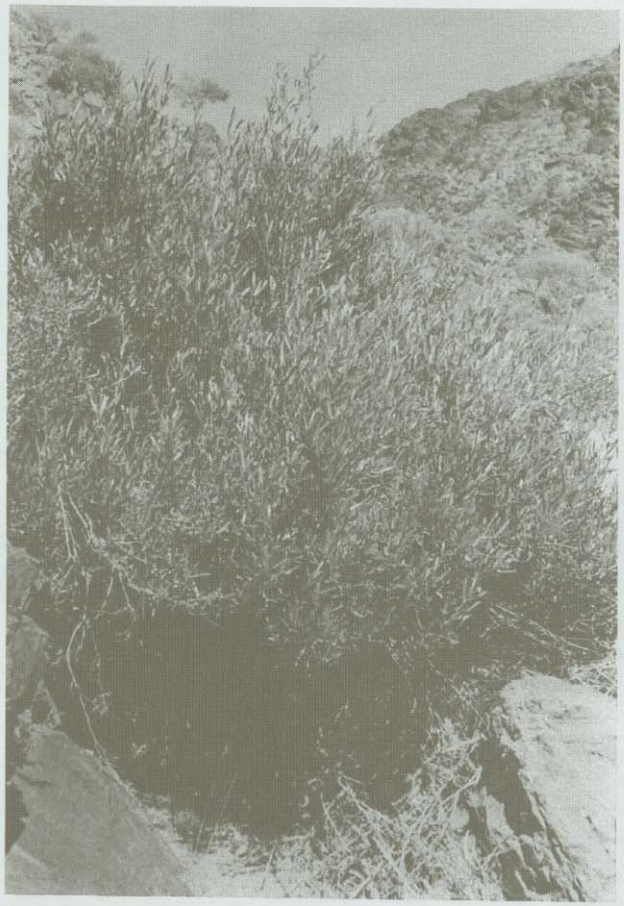

Fig. 6. *Dodonaea viscosa* L.

Ziziphus spina-christi trees.

Location 29: (1770 m a.s.l.; 279 km north of Abha and the site of wadi Sakaran).

This is an important location where *Faidherbia albida* (Del.) A. Chev. (Fig. 7), is found. The conifer forest that harbors this taxon lie on both sides of the motorway and

there is danger that the few trees observed may be destroyed as the suburbs of balgurshi city expand. It is highly recommended here that this conifer forest must be protected to safeguard the existence of this tree in Saudi Arabia.

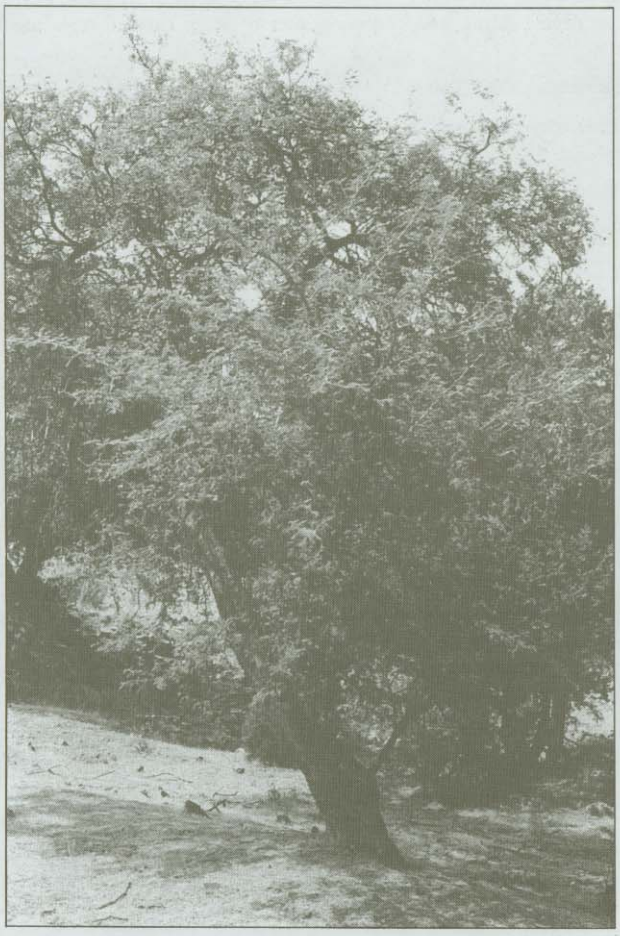

Fig. 7. ***Faidherbia albida*** **(Del.) A. Chev.**

Locations 30: (1870 m a.s.l.; 301 km north of Abha), and

31: (2100 m a.s.l.; 302 km north of Abha).

Both locations are within the suburban boundaries of Balgurshi city. Worshops, gardens, neglected farms, and collection sites of scarp cars are replacing the natural scenery.

Location 32: (2000-2050 m a.s.l.; 305 km north of Abha).

Al-Baha city. Most of the remarks made about Baljurhsi and its suburbs are valid here also. Much destruction to the vegetation is being done.

(b) Al-Baha–Al-Taif motorway

Locations 33: (2000-2050 m a.s.l.; 10 km north of Al-Baha), and

34: (1950 m a.s.l.; 20 km north of Al-Baha).

Both locations are suburbs of Al-Baha city. *Juniperus excelsa, Acacia gerrardii, Rhamnus oleoides, solanum incanum,* (Fig. 8), *Rumex nervosus, Kleinia odorata, psiadia punctulata, Cluytia myricoides, lavandula dentata, L. pubesens,* and *Otostegia fruticosa* are observed.

Fig. 8. *Solanum incanum* L.

Location 35: (1850 m a.s.l.; 37 km north of Al-Baha).

Hill sides are devoid of trees. The area is rain-shadow belt.

Locations 36: (1750 m a.s.l.; 39 km north of Al-Baha), and

37: (1659 m a.s.l.; 42 km north of Al-Baha), and

38: (1550 m a.s.l.; 43 km north of Al-Baha), and

Site of Bani Adwan village with *Juniperus excelsa, Olea chrysophylla, Acacia gerrardii, Ochradenus baccatus,* and *Otostegia fruticosa. Ziziphus spina-christi* appears in wadis.

Location 39: (1250 m a.s.l.; 52 km north of Al-Baha).

Neither *Juniperus excelsa* nor *Olea chrysophylla* were seen. Some scattered *Acacia tortillis* and *Rhamnus oleoides* were noticed.

Locations 40: (1300 m a.s.l.; 125 km north of al-Baha), and

41: (1400 m a.s.l.; 139 km north of al-Baha), and

42: (1300 m a.s.l.; 141 km north of Al-Baha), and

43: (1400 m a.s.l.; 150 km north of Al-Baha), and

44: (1300 m a.s.l.; 162 km north of Al-Baha).

Qaryat el Sir. All locations fall within the rain-shadow side and the mountains appear bare except for *Commiphora opobalsamum* and *Acacia tortilis.*

Location 45: (1500 m a.s.l.) and the site of Al-Hada suburb of Al-Taif. Much afforestation is going on at the moment in Al-Taif area. Several elements are being introduced but the most important natural element near Taif is *Juniperus phoenicea* L.

Concluding Remarks

1. The Abha–Al-Baha motorway runs over a plateau fluctuating between 2400 and 1700 m a.s.l. The vegetation is richer throughout this part of the drive, as the area receives moisture-laden winds.

2. The Al-Baha section of the motorway also fluctuates between 2000 and 1100 m a.s.l. It passes along the water-shed where both the rain-shadow and the rain-fed belts cut through. Thus parts o the route appear dry and devoid of vegetation, while in other parts the vegetation is more varied.

3. The motorway transacts natural vegetational belts, thus giving an insight into their variation, and thereby helping the keen student, researcher and tourist to appreciate the differences.

4. The construction of this motorway was based on its economic feasibility but the towns and villages along it significantly affected the natural vegetation. Human actions had their ecological consequences on the environment. Most important of these are the active or the deserted rain-fed small agricultural plots and the traditional terrace cultivation. In addition tree felling for fuel and building construction has devastated certain areas.

5. An important aspect of the study is that it will serve as a base in study for comparison at a future time to record changes in vegetation that may occur.

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APPENDIX 1

The taxa and their ecological belts (belts according to Baierle *et al.* [5]).

I Predominantly evergreen needle-leaved woodlands with drought deciduous trees (alt. 2000-2500 m).

Acacia gerrardii Benth.	Leguminosae
A. negrii Pichi-Sermolli	Leguminosae
Barleria bispinosa (Forssk.) Vahl	Acanthaceae
Cluytia richardiana Muell.-Arg.	Euphorbiaceae
Cornulaca monacantha Del.	Chenopodiaceae
Dodonaea viscosa L.	Sapindaceae
Euryops arabicus Steud.	Compositae
Ficus salicifolia Vahl	Moraceae
Juiperus excelsa M. Bieb.	Cupressaceae
Lavandula dentata L.	Lamiaceae
Nuxia congesta R. Br.	Loganiaceae
Periploca aphylla Decne.	Asclepiadaceae
Psiadia punctulata DC.	Compositae
Rhamnus oleoides L.	Rhamnaceae
Rosa abyssinica R. Br.	Rosaceae
Tarchonanthus camphoratus L.	Compositae

II Evergreen needle-leaved woodland resistant to cold (alt. 1500–2000 m)

Aerva lanata (L.) Juss. ex. Schult	Amaranthaceae
Capparis cartilagenea Decne.	Capparaceae
Caralluma penicillata (Defl.) N.E. Br.	Asclipiadaceae
C. russuliana (Courb. Ex brongn.) Cufod	Asclepiadaceae
Dodonaea viscosa L.	Sapindaceae
Euryops arabicus Steud.	Compositae
Euphorbia fractiflexa C. Carter and J.R.I. Wood	Euphorbiaceae
Faidherbia albida (Del.) A. Chev.	Leguminosae
Ficus populifolia Vahl	Moraceae
Juniperus excelsa M. Bieb.	Cupressaceae
J. phoenicea L.	Cupressaceae
Kleinia odorata (Forssk.) DC.	Compositae
Lavandula dentata L.	Lamiaceae
L. pubescens Decne.	Lamiaceae
Otostegia fruticosa (Forssk.) Schweinf. ex	Penzig Lamiaceae
Periploca aphylla Decne.	Asclepiadaceae
Pstadia punctulata DC.	Compositae
Rumex nervosus Vahl	Polygonaceae

III Evergreen broad-leaved woodlands (alt. 1750-2000 m).

Acacia gerrardii Benth.	Leguminosae
Barbeya oleoides Schweinf.	Barbeyaceae
Dodonaea viscosa L.	Sapindaceae
Jasminum grandiflorum L. var. *floribundum* (R.Br. ex Fresen.) P.S. Green	Oleaceae
Ochradenus baccatus Del.	Resedaceae
Olea chrysophylla Lam.	Oleaceae
Pistacia falcata Mart.	Anacardiaceae
Psiadia punctulata DC.	Compositae
Solanum incanum L.	Solanaceae

IV Sclerophyllous-rich extremely xeromorphic woodlands (alt. 1250–1500 m).

Acacia asak (Forssk.) Willd.	Leguminosae
A. etbaica Schweinf.	Leguminosae
Calotropis procera (Ait.) Ait. f.	Asclepiadaceae
Dodonaea viscosa L.	Sapindaceae
Lavandula dentata L.	Lamiaceae
Olea chrysophylla Lam.	Oleaceae
Otostegia fruticosa (Forssk.) Schweinf. Ex Penzig	Lamiaceae
Periploca aphylla Decne.	Asclepiadaceae
Psiadia punctulata DC	Compositae
Rhazya stricta Decne.	Apocynaceae
Salvadora persica L.	Salvadoraceae

Thorn Woodlands

Acacia asak (Forssk.) Willd.	Leguminosae
A. ehrenbergiana Hayne	Leguminosae
A. etbaica Schweinf.	Leguminosae
A. gerrardii Benth.	Leguminosae
A. hamulosa Benth.	Leguminosae
A. tortilis (Forssk.) Hayne	Leguminosae
Adenium obesum (Forssk.) Roem. And Schult.	Apocynaceae
Aerva lanata (L.) Juss. ex J.a. Schultes	Amaranthaceae
Anisotes trisulcus (Forssk.) Vahl	Acanthaceae
Commiphora opobalsamum (L.) Engl.	Burseraceae
Ziziphus spina-christi (L.) Willd.	Rhamnaceae

APPENDIX 2

A small list of trees and shrubs which may occur in the area probably in between our locations. Taxa arranged alphabetically within their families.

Acanthaceae
Barlaria trispinosa (Forssk.) Vahl
Blepharis maderaspatensis (L.) Roth
Anacardiaceae
Rhus abyssinica Steud. Ex oliv.

Apocynaceae
Carissa edulis (Forssk.) Vahl

Boraginaceae
Cordia ovalis R. Br. Ex DC.

Burseraceae
Commiphora gileadensi (L.) C. Christ.

Capparaceae
Boscia angustifolia A. Rich.

Celastraceae
Maytenus heterophylla (Eklon Zeyher) N. Robson
M. somalensis (Loes.) Cufod.
M. undulata (thunb.) Blakelock

Compositae
Conyza pyrrhopappa Sch-Bip. ex A. Rich.
Pluchea discorides DC.

Ebenaceae
Euclea schimperi (A.DC.) Dandy

Ephedraceae
Ephedra intermedia Schrenk and C.A. Mey.

Ericaceae
Erica arborea L.

Euphorbiaceae
Euphorbia inarticulata Sond.
Jatropa spinosa (Forssk.) Vahl

Hypericaceae
Hypericum revolutum Vahl
H. hircinum L.

Labiatae

Plectranthus asirensis J.R.I. Wood

P. barbatus Andr

P. cylindraceus Hochst. ex Benth.

P. mrrubioides Hochst. and Benth.

Leguminosae

Acacia elatior Brenan

A. negrii Pichi-Sermolli

Anagyris foetida L.

Cassia occidentalis L.

Malvaceae

Abutilon bidentatum Hochst. ex A. Rich.

Moraceae

Ficus carica L.

f. ingens (Miq.) Miq.

Moringaceae

Moringa peregrina (Forssk.) Fiori

Myrsinaceae

Maesa lanceolata Forssk.

Myrsine africana L.

Ochnaceae

Ochna inermis (Forssk.) Schweinf.

Passifloraceae

Adenia venenata Forssk.

Rhamnaceae

Segeretia thea (Obs.) M.C. Johnst.

Rosaceae

Rubus sanctus Schreb.

Salicaceae

Salix subserrata Willd.

Solanaceae

Lycium shawii Rhoem. and Schult.

Tamaricacea

Tamarix macrocarpa (Ehrenb.) Bunge

Tiliaceae

Grewia mollis Juss.

G. tembensis Fresen.

G. villosa Willd.

Ulmaceae

Celtis africana Burm. f.

أشجار وشجيرات جانبي الطريق في المملكة العربية السعودية
طريق أبها ـ الطائف السريع

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الرياض ١١٤٥١ ، المملكة العربية السعودية
المملكة العربية السعودية

(استلم في ٧/ ٥/ ١٤١٦هـ ، وقبل للنشر في ٧/ ٦/ ١٤١٧هـ)

ملخص البحث. يبلغ طول طريق أبها ـ الطائف السريع حوالي ١٢٧٥كم، ويمتد على ارتفاع يتراوح من ١٥٠٠ إلى ٢٢٥٠ مترًا فوق سطح البحر. المناظر على جانبي هذا الطريق متباينة، وذلك لأن بعض أجزاء الطريق تواجه مسار السحب المشبّعة بالرطوبة بينما أجزاء أخرى من الطريق تقع في ظل المطر. يخترق الطريق نطاقات من الغطاء النباتي تمت دراستها على أساس مواقع عددها ٤٥. تأثر الغطاء النباتي بصورة مدمّرة بوجود العديد من المدن والبلدان والقرى. وتستخدم هذه الدراسة كقاعدة لمقارنات مستقبلية لتسجيل أي تغيرات تحدث في الغطاء النباتي.