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Road-side Trees and Shrubs in Saudi Arabia alongside Al-Qunfudah-Al-Baha, Motorway (Aqabat el-Baha)

Hassan Mustafa Hassan and Fahad Mohamed Al-Hemaid
Department of Botany and Microbiology, College of Science, King Saud University, P.O. Box 2455, Riyadh 11451, Saudi Arabia

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Abstract. The Al-Qunfudah-Al-Baha motorway (Aqabat el-Baha), connects the Tihama coast on the Red Sea with Al-Baha (2400 m). The present study lists the taxa seen along the motorway. The route transects several vegetational belts. The effects of the numerous villages on the vegetation and the phenomenon of sand-piling between the foot-hills leading to the escarpment are indicated.

Introduction

Al-Baha is the smallest province in Saudi Arabia. It covers an area of some 10,690 km^2 and is located in the south-western part between Abha and Taif provinces. The area reaches an altitude of ca.2300 m at Al-Baha. Two main motorways lead to the Province's capital: one runs along the mountainous plateau connecting Taif to Abha and then proceeds south; the other connects Al-Baha with the warm coastal plains of Qunfudah.

The second route, the Baha descent motorway is a 45 km stretch of highway meandering over formidable cliffs, running through 34 tunnels, 67 bridges and descending from 2500 m to sea-level.

The area has been studied by several authors from different aspects, in most studies as part of the highlands of Saudi Arabia [1-7].

The present study deals with the latter route, commonly referred to as the Qunfudah-Makhwah-Baha Aqaba road, running from the sea-coast up the escarpment (Fig. 1). This route was visited by the senior author in 1981, 1982 and 1990 and by both authors in 1991 and 1992, as a field study site for the B.Sc. students.

Methods

The motorway is divided into two parts: (a) the Tihama coastal plain (0-350 m); and (b) the escarpment and its foot-hills (350-2500 m).

The drive along the motorway was set at slow speed to allow for frequent stoppage to collect, record and photograph the plants. The total distance was divided into locations (1-21) in a manner of ascent of 100 m using an altimeter. At the same time and by use of the car speedometer the horizontal distance between one location and the next was recorded.

In total 21 locations were studied: 3 fall on the Tihama coastal plain and 18 along the Makhwah-Al-Baha escarpment.

The plants are mentioned in the present paper in the order in which they were recorded on sight. Sometimes the use of binoculars was employed to identify remote specimens. Plant identification was based on the works of Baierle *et al.* [2], Collenette [4] and Migahid [5].

All herbarium specimens are kept in the Department of Botany and Microbiology. An alphabetical list of taxa recorded along the motorway is given in the Appendix.

Fig. 1. *Avicennia marina* (Forssk.) Vierh. with few halophytic species on coastal fringe

Results and Discussion

(a) Al-Qunfudah-Muzailif-Makhwah Coastal Plan (Tihama)

Location 1: *(0-100 m)*

The mangrove *Avicennia marina* is located some 10 km to the south of Al-Qunfudah, following an unmetalled road running parallel to the Gizan Motorway and the Red Sea coast.

The vegetation further from the tidal zone consists of *Halopeplis perfoliata, Limonium axillare, Aeluropus lagopoides, Asparagus falcatus, Suaeda fruticosa, Cornulaca monacantha* and *Zygophyllum coccineum.* Further still the grass *Panicum turgidum,* a few *Jatropa glauca* shrubs and scattered small *Leptadenia pyrotechnica* shrubs exist.

The outskirts of Muzaleif town are marked with rain-cultivated small plots, some seen still carrying dry *Sorghum bicolor.* These cultivated plots (some appear deserted) are with scattered *Tamarix aphylla* trees (Fig. 2) probably preserved as wind breakers or for shade. Several weed taxa such as *Diptergium glacum, Calotropis procera, Abutilon bidentatum* and *Senna alexandrina* were recorded.

On reaching an altitude of 50 m (at 50 km from the coast) the vegetation changes and sand-binding taxa including *Capparis decidua, Cadaba rotundifolia, Salvadora persica* and *Leptadenia pyrotechnica* are common.

At an altitude of 75 m the *Acacia* woodland appears. The most frequent species here are *Acacia tortilis* (Fig. 3), *A. ehrenbergiana,* and *A. hamulosa.*

Location 1 ends at Muzailef town which lies at 90 m a.s.l. and is 80 km away from the coast.

Location 2: *(100-200 m a.s.l.; 85 km from coast and the site of Qaryat Nawan)*

The effect of the village on the natural surroundings is too obvious. Trees such as *Commiphora myrrah, C. opobalsamum, Acacia tortilis, Ziziphus spinachristi* and *Salvadora persica* are confined to wadis (Fig. 4). Of majestic impact is the hudge accumulation of the Tihama white sand in-between the hilly peaks of this area (Fig. 5). Such sand movement can bring disaster to the area!

Location 3: *(200-300 m a.s.l.; 100 km from coast and the site of Qaryat Rahwat Al-Shar)*

Acacia etbaica, Adenium obesum, and *Anisotes trisulcus* are common. The surroundings are the same as for Location 2.

Fig. 2. ***Tamarix aphylla*** **(L.) Karst. in the vicinity of Al-Gunfudah**

Fig. 3. ***Acacia tortilis*** **(Forssk.) Hayne at edge of wadi in vicinity of Muzailef**

Fig. 4. ***Acacia tortilis, Ziziphus spina-christi*** **and** ***Salvadora persica*** **in a wadi near Qaryat Nawan**

Fig. 5. Tihama sand accumulation between Sarawaat foot hills-Al-Qunfudah-Muzailef Road. Several plant species were burried. The few remaining ***Acacia tortilis*** **(bottom right corner) are doomed**

Fig. 6. ***Dodonaea viscosa*** **L. on rocky terrain by the roadside**

(b) The Makhwah-Baha Escarpment

Location 4: *(300-400 m a.s.l.; 127 km from coast and the site of Al-Makhwah town)*

The effect of the town vicinity on the vegetation is apparent. Only along valleys on the surrounding hills can one spot *Acacia tortilis, Anisotes trisulcus, Caralluma russueliana* and *Commiphora opobalsamum.*

Location 5: *(400-500 m a.s.l.; 140 km from the coast and the site of Qaryat Al-Marwa)*

The taxa observed are the same as in the previous location.

Location 6: *(500-600 m a.sl.; 144 km from the coast and the site of Qaryat el Rayanah)*

Nothing exists besides *A. tortilis* and *A. etbaica.*

Location 7: *(600-700 m a.s.l.; 149 km from the coast and the site of Qaryat Al Ain)*

The taxa are the same as in the previous location.

Location 8: *(700-800 m a.s.l.; 152 km from the coast)*

Two *Acacia* species are seen: *A. ehrenbergiana* and *A. tortilis* in addition to *Anisotes trisulcus* and the epiphytic *Cissus quadrangularis.*

Location 9: *(800-900 m a.s.l.; 154 km from the coast)*

All the taxa seen in location 8 are met with here, in addition to few evergreen small trees of *Ficus salicifolia.*

Location 10: *(900-1000 m a.s.l.; 157 km from the coast)*

The same taxa as in the previous location are seen in addition to *Capparis cartilagenea, Commiphora opobalsamum* and few *Adenium obesum* silver-stemmed shrubs.

Location 11: *(1000-1100 m a.s.l.; 158 km from coast)*

Here one can find *Ziziphus spina-christi, Ficus salicifolia, Commiphora opobalsamum, Anisotes trisulcus* and *Acacia ebaica.*

Location 12: *(1100-1200 m a.s.l.; 161 km from coast)*

Most important here is the appearance of *Pistacia falcata* and *Acacia negrii* with several of the taxa mentioned in the previous location.

Location 13: *(1200-1300 m a.s.l.; 163 km from coast)*

Most important here is the appearance of few *Olea chrysophylla* trees (dull green leaves) mixed with *Barbeya oleoides* (bright yellowish green leaves). These two taxa are confused with each other but close examination of the plant in particular of the flowers is the only means to settle the difference. Other taxa include *Acacia gerardii, A. negrii, A. asak, A. etbaica, Rumex nervosus* and *Dodonaea viscosa* (Fig. 6).

Location 14: *(1300-1400 m a.s.l.; 164 km from coast)*

The same taxa as in the previous location with few *Capparis cartilagenea* on rock sides in crevices are encountered.

Location 15: *(1400-1500 m a.s.l.; 168 km from coast)* and ***Location 16:*** *(1500-1600 m a.s.l.; 168 km from coast)*

Same taxa as in above location.

Location 17-20: *(1600-1700 m a.s.l.; 170 km from coast);*
(1700-1800 m a.s.l.; 171 km from coast);
(1800-1900 m a.s.l.; 174 km from coast);
(1900-2000 m a.s.l.; 176 km from coast) respectively

Most important here is the appearance of Juniperus excelsa, mixed with Olea chrysophylla.

Location 21: *(2000-2500 m a.s.l.; 178 km from coast)*

At Al-Baha city, the climax vegetaton is composed of *Juniperus excelsa, Acacia gerrardii, A. nigrii* in addition to *Dodonaea viscosa, Rhamnus staddo, Rumex nervosus, Klenia odorata, Solanum incanum, Cluytia richardiana, Periploca aphylla* and *Euryops arabica.*

From the above findings, the following remarks are made:

1) The Escarpment is very steep.
2) Several villages, towns and cities are built along the motorway and their impact on the vegetation is seen in clearance of mountain sides, felling of trees, and setting up of small agricultural plots.
3) Several villages are surrounded by small-scale farms which are abandoned or deserted or cropped only in good rainy years, allowing for several weed taxa to develop.
4) Most of the tree and shrubby taxa along the Tihama stretch of the motorway (0-350 m) appear to be sand-accumulators rather than binders. Some of these taxa might have been burried under the sand, not only that, but small valleys (wadis) were completely filled with blowing Tihama sand (Fig. 5).

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Appendix

The taxa recorded along the route and their ecological belts according to Baierle *et al.* [2].

I) *Predominantly evergreen needle-leaved woodlands with drought decidous trees (Alt. 200-2500 m)*

Acacia negrii Pichi - Sermolli
Cluytia richardiana Muell. Arg.
Dodonaea viscosa L.
Euryops arabicus Steud.
Juniperus excelsa M. Bieb.

II) *Evergreen Needle-leaved woodland resistant to cold (Alt. 1500-2000 m)*

Dodonaea viscosa L.
Euryops arabicus Stued.
Juniperus excelsa M. Bieb.

III) *Evergreen Broad-leaved woodlands (Alt. 1750-2000 m)*

Acacia negrii Pichi – Sermolli
Barbeya oleoides Schweinf.
Dodonaea viscosa L.
Olea chrysophylla Lam.
Pistacia falcata Mart.

IV) *Sclerophyllous-rich extremely xeromorphic woodlands (Alt. 1250-1500 m)*

Acacia etbaica Schweinf.
Ficus salicifolia Vahl
Olea chrysophylla Lam.

V) *Thorn woodlands*

Acacia ehrenbergiana Hayne
A. etabica Schweinf.
A. hamulosa Benth.
A. tortilis (Forssk.) Hayne
Adenium obesum (Forssk.) Vahl
Commiphora opobalsamum Engl.
Ziziphus spina-christi. (L.) Willd.

VI) *Semidesert shrublands: 0-150 m (Tihama)*

Acacia ehrenbergiana Hayne
A. tortilis (Forssk.) Hayne
Cadaba rotundifolia Forssk.
Capparis decidua (Forssk.) Edgw.
Dipterygium glaucum Decne.
Tamarix aphylla (L.) Karst.

VII) *Mixed formation of Halophylic open xeromorphic scrubs*

Tamarix aphylla. (L.) Karst.

VIII) *Very open desert-like formation on salty soils*

Aeluropus lagopoides (Linn.) Trin. ex Thwaites
Cornulaca monacantha Del.
Halopeplis perfoliata (Forssk.) Bunge
Limonium axillare (Forssk.) O. Kuntze
Suaeda fruicosa Forssk. ex Gmel.
Zygophyllum coccineum L.

IX) *Mobile dunes in desert climate (Tihama)*

Leptadenia pyrotechnica (Forssk.) Decne.
Panicum turgidum Forssk.
Salvadora persica L.

X) Mangrove

Avicennia marina (Forssk.) Vierh.

أشجار وشجيرات جانبي طريق (القنفذة ـ الباحة) السريع في المملكة العربية السعودية

حسن مصطفى حسن وفهد محمد عبدالرحمن الحميد

قسم النبات والأحياء الدقيقة، كلية العلوم، جامعة الملك سعود،

ص.ب ٢٤٥٥، الرياض ١١٤٥١، المملكة العربية السعودية

(سُلِّمَ في ١٤١٤/٦/١٦هـ؛ وقُبل للنشر في ١٤١٥/٥/٤هـ).

ملخص البحث. طريق (القنفذة ـ الباحة) السريع (عقبة الباحة) يربط ساحل تهامة على (البحر الأحمر) مع الباحة على ارتفاع (٢٤٠٠م). تقدم هذه الورقة العلمية قائمة بأسماء الأشجار والشجيرات التي تشاهد على جانبي الطريق. وأوضحت الورقة أن الطريق يعبر نطاقات لأحزمة للغطاء النباتي مما يكسبه مغزى إضافيًا. تشير الورقة أيضًا إلى تأثيرات القرى العديدة على الغطاء النباتي. وتوضح أيضًا ظاهرة تراكم رمال تهامة فيما بين التلال السفلى التي تقود إلى الجرف الجبلي.