ECOLOGICAL AND PHYTOCHEMICAL STUDIES ON *Verbascum fruticulosum* Post.

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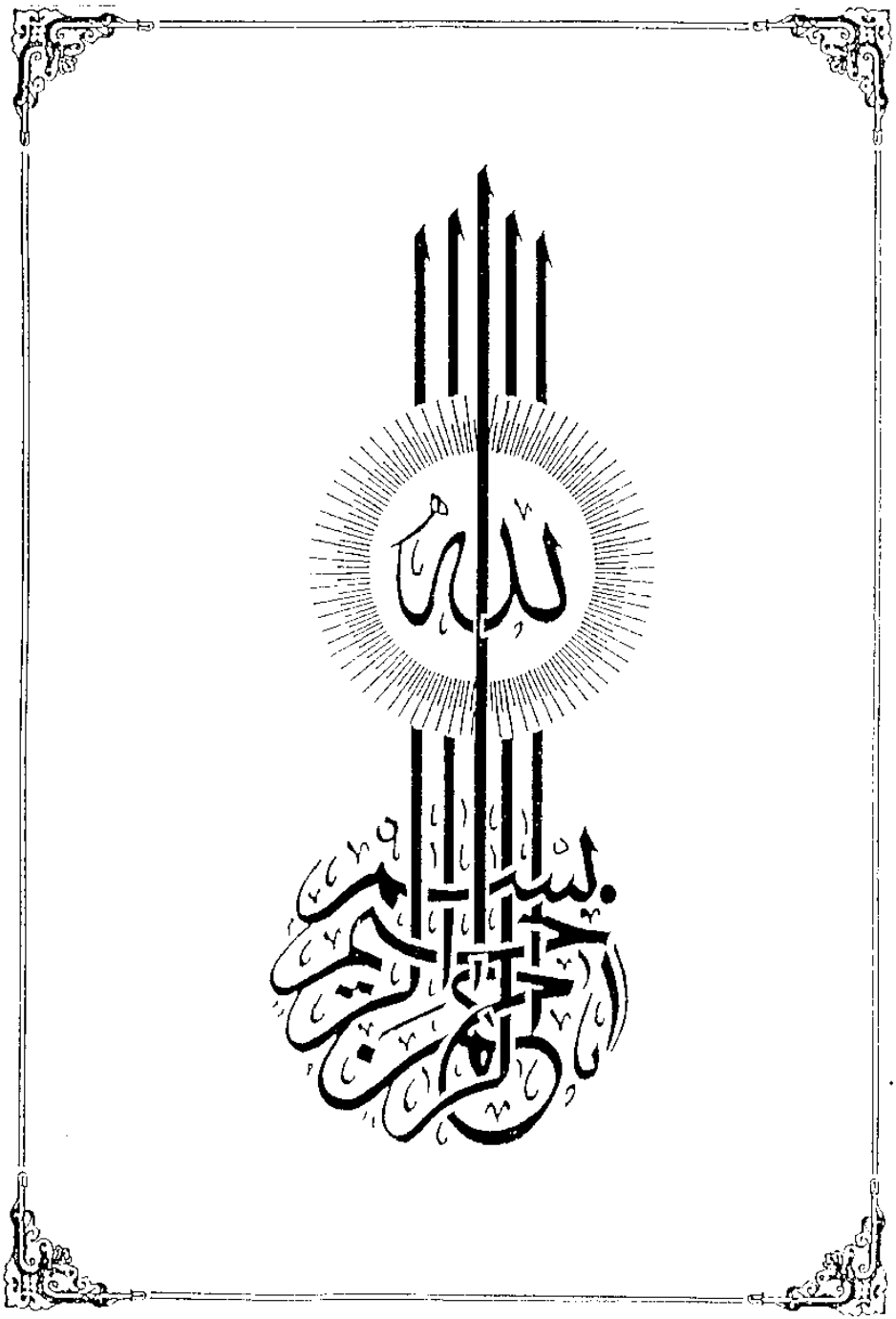

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INTRODUCTION

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Phytochemical investigations made on some desert plant species in recent decades revealed the occurrence of some active constituents of medical importance. This encouraged work on desert flora hoping to find out active constituents of medicinal value

The work embodied in this dissertation was made on *Verbascum fruticulosum* Post. which belongs to the family Scrophulariaceae and spread in Wadi Sudr South Sinai and El-Tih desert.

Systematic Position:

The systematic position according to Tackholm (1974) of *Verbascum fruticulosum* is as follow:

Division	:	Angiospermae
Class	:	Dicotyledoneae
Subclass	:	Sympetalae
Order	:	Tubiflorae
Family	:	Scrophulariaceae
Genus	:	*Verbascum*
Species	:	*fruticulosum*

The plant is frutescent, about 90 cm high, leaves are broad, thick yellow grey and the basal ones up to 20 cm long and lobed

or parted. Racemes lax 5-20 flowered filaments purple-woolly, capsule globose (Tackholm, 1974).

The plant is perennial, grows in rocky soil and flourish in autumn.

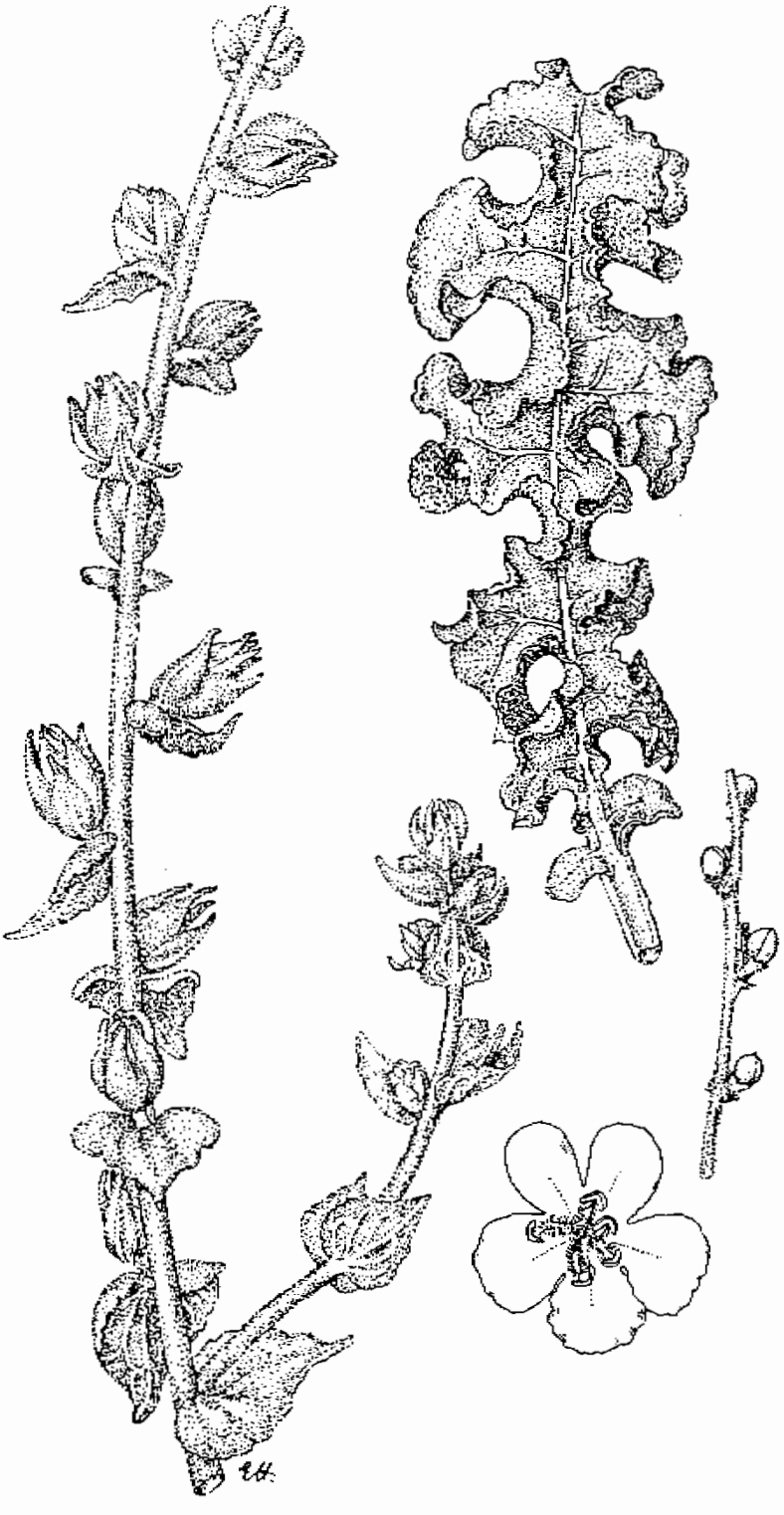
Scrophulariaceae is a world wide distributed family. It is reputed to be one of the families containing a vast number of both medicinal and poisonous plants.

There are wide use of *Verbascum* species of the family Scorphulariaceae for medicinal purpose and many pharmacological studies carried out on this species.

Scrophulariaceae is characterized by its content of different alkaloids, saponins and flavonoid compounds which has an therapeutical values.

Statkov (1965) reported that the total alkaloids of *Verbascum nobile* exerted a blocking effect on the N. choline reactive biochemical systems of vegetative ganglia of the medullar portion of the adrenal glands and of the chemoreceptors in the reflexogenic zone of the carotid sinus.

Wern (1965) reported that the flowers of *V. thapsus* are medicinally used as emollient, pectorial and astringent.



Verbascum fruticulosum Post (according to FEINBRUN_DOTHAN,1977)

Numerous physiological activities have been attributed to the presence of flavonoid compounds, thus small quantities of flavones may act as cardiac stimulants, some flavones e.g. hespiridin appear to strengthen weak capillary blood vessels, highly hydroxylated flavones behave like auxins in stimulating the germination of wheat seeds. Other flavonoid compounds used as anticancer (Ross and Brain, 1971) antidiabetic (Edward, 1979) and as antibiotic (Augusti, 1975).

Khuroo *et al* (1988) reported that *V. thapsus* are considered to be anti-endemic and its seeds aphrodiasic and narcotic in nature. It has been employed for the treatment of asthma and other pulmonary complaints.

The plant was shown to elaborate oleanane type triterpenoid saponins and iridoid glycosides.

Mehrotra *et al.* (1989) reported that *V. thapsus* is used in the indigenous system of Indian medicine for the treatment of inflammatory disease, asthma, spasmodic coughs and migraine. It has also been reported to possess antiviral activity against influenza in chicken embryos.

Aims Of Study:

The present work aims to study the environmental conditions affecting the growth and survival of *Verbascum fruticulosum* and to investigate its main chemical constituents such as carbohydrates, lipids, sterols, proteins and active materials which improve its economic and medicinal values.

REVIEW OF LITERATURE

Scrophulariaceae is a large family of about 210 genera and nearly 3000 species of cosmopolitan distribution and represented on all constituents.

The largest genera are *Pedicularis* (Probably 600 sp.) *Calceolaria* (500), *Penstemon* (250), *Verbascum* (250) *Linaria* (150), *Mimulus* (150), *Veronica* "Exd-Hobe" (150), *Hebe* (140) and *Castilleja* (100) of these all are of the northern hemisphere except *Hebe* (Australia) and *Calceolaria* (Western South America).

The larger genera in this country include *Penstemon, Mimulus, Veronica, Geradia, Chytra, Castilleiaja* and *Pedicularis.* (Lawrence, 1967). Therefore, it was advisable to review the published data, dealing with the main constituents of the plants belonging to the family to be used as a guide in investigation of the constituents of *Verbascum fruticulosum.*

Alkaloids

Ninova (1965) mentioned that *Verbascum nobile* contain the alkaloids N_1, N_2 and N_3, these alkaloides have R_f values close to hyoscyamine, papaverine and quinine.

To separate nobilin alkaloids, thin layer chromatography was used as intermediate stage into the shift to column chromatography by means of Al_2O_3.

Ninova and Paskov (1969) reported that the alkaloids of *Verbascum nobile* was obtained by means of the organic solvent pyridine. They also found alkaloids in the overgreen part of the plant during the period of blossoming in *Verbascum nobile, V. decorum* and *V. phoeniceum* where meanwhile alkaloids of (9) plants of this family (Scrophulariaceae) were chromatographically characterized, where *V. nobile* contain >1% alkaloids.

In (1971) Ziyaev *et al.* isolated anabasine, plantagonine, acetamide and unidentified base with m.p. 195-196°C from the *Verbascum songaricum* and reported that the alkaloids were most abundant in buds and leaves.

Saponins

Constantinescu *et al.* (1962) detected saponisides contents in *Verbascum phlomoides, Vebascum thapsiforme, V. nigrum* and *Scrophularia nodcsa*, which were estimated by haemolysis test.

Large amounts were found in flowers and leaves, while small amounts were found in roots (*Verbascum nigrum* and *V. speciosum*). On the other hand, negative results were obtained from stems.

Gladkikh *et al.* (1965) determined the content of saponins in different plants by haemolytic method. A high haemolytic index was determined in *V. cheiranthifolium.*

Flavonoids:

Lobete (1942) and Obduli and Lobete (1943) investigated rotenone and its determination in *Verbascum thapsus.* It occurs in the leaves of the plant which varies between 0.027 and 0.085 according to season and location.

Infusion of the leaves were toxic to fish but the powdered dry leaves are apparently without insecticidal value.

Hein (1959) declared that the flowers of *Verbascum phlomoides* contain the flavonoids, hesperidin and a flavonol-3-glycoside designated as verbascoside.

It contains also glucose and rhamnose as sugar components and in all organs of *Verbascum phlomoides.* In addition, two aglycones with lower R_f values occur in the above-ground vegetative organs and in the seeds.

Hesperidin and verbascoside occur in the flowers of all investigated species *Verbascum olympicum, V. nigrum, V. maurum, V. gnaphalodes, V. lychnitis, V. floccosum* and *V. phoeniceum,* (hybrid of *V. phoeniceum,* x *V. nigrum).*