

Torilis stocksiana (Boiss) Drude. In Engl. Das Pflzn. (1898).

Plants 25-80 cm tall and hispid; leaves 1-2 pinnate, pinnae dissected; ultimate segments oblong-lanceolate; peduncles long, leaf opposed; involucre bracts absent; umbels 2-6 rayed, rays unequal, densely pubescent at base; involucre of 5-7 linear bractlets; flowers white; fruit oblong-elliptical, mericarps laterally compressed with a narrow (0.5 mm broad) commissural face, each mericarp bears five primary ridges that are clothed with a row of papillate hairs, secondary ridges present in between the primary ridges bear 2-3 rows of straight, hard and glochidate spines; mericarp 5.0 x 1.5 mm

in size. Flowering time, February-April.

Distribution: The species is so far known only from Iran (Mediterranean region). In Jammu and Kashmir state, it is distributed from subtropical regions of Jammu (IAH, 90) and Udhampur (IAH, 151) to outer hills of Rajouri (IAH, 74) and Poonch (IAH, 78).

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29. PHENOTYPES OF SANDAL (*SANTALUM ALBUM* L.)

INTRODUCTION

Santalum album L. exhibits plenty of variations and earlier workers attempted to categorise them into certain types. As early as 1874, Roxburgh found a variety of sandal growing in Northern Circars which was quite different from the normal sandal and described it as a separate species *Santalum myrtifolium*. De Candolle (1856) believed it to be a variety of *Santalum album* L. Brandis however united them into one species namely *Santalum album* L. and this was followed by Hooker (1890) in his Flora of British India. Lushington (1900) believed them to be two distinct species. Badami and Venkata Rao (1930) studied the

variations found in the *Santalum album* L. and explored the possibilities of distinguishing different types. Griffith (1937) described a peculiar variety of sandal occurring in the Noganur R.F. of the present Hosur Division (Tamil Nadu). It had all the outward characteristics of spiked sandal but otherwise remaining healthy and bearing flowers and fruits.

With this back ground, investigations were carried out in this centre to find out the occurrence of distinct phenotypes in the natural populations. Though, based on various morphological characters, a number of phenotypes could be recognised. So far this centre has been able to distinguish three definite phenotypic populations and they are described below.

DESCRIPTION OF PHENOTYPES

1. *Thindlu* type of sandal:

This type is characterised by small diameter class trees around 4 to 8 cm dbh with a dark brown bark which comes out in irregular flakes. The most distinguishable character is that the sapwood thickness is very narrow 2 mm to 10 mm. The heartwood is dark brown in colour with distinct annual rings. It appears to be slow grown as the trees with 8 cm dia. show around 25 to 30 annual rings. To conserve this gene resource protection measures have been undertaken.

Occurrence: This type was first found in the Thindlu reserve in Hoskote range of Bangalore Division, Karnataka state and hence the name. In this place, besides this type, other types of sandal also occur in small percentage. It also occurs in other nearby reserves of Hoskote Range, in Vakkaleri reserve of Kolar Division, Ammanakatte forest of Hassan Division of Karnataka state and Valliyur R. F. of Kallakad wild life Division of Tamil Nadu.

2. *Chickballapur* type of sandal:

This type is characterised by the presence of small bluish green leaves with sparse crown. This tree resembles more or less a spiked plant and probably may correspond to the Noganur type of sandal described by Griffith (1937). Unlike Thindlu type the sapwood thickness is

not narrow.

Occurrence: It occurs in Kamasettyhalli reserve, Chickballapur Range of Kolar Division and in some reserves of Shimoga Division, Karnataka State.

3. *Robust* type of sandal:

These populations usually have a compact crown with lush green foliage. The stem is usually straight and cylindrical with rust brown smooth bark having very thick sapwood (around 5 cm). This appears to be fast growing as compared to all other types as seen in even aged plantations.

Occurrence: This occurs as individual trees or in groups in most of the sandal bearing areas and can be readily recognised by the above characters. In the Srinivasapura S. F. of Kolar Division this is the most predominant type.

Besides looking for other distinct types, intensive studies on the above three types are being done. The studies include morphological, cytological and biological investigations which are likely to establish the correct taxonomical identity. In addition to establishing the taxonomical identity of these phenotypes studies on their performances in different eco-climatic regions are also underway to evaluate their usefulness in the genetic improvement of sandal.

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