The paper deals with 18 rare/threatened medicinal plants of forests of Santhal Pargana Division, Jharkhand. Out of such medicinal plants, 10 are rare in occurrence. The threatened categories encompass near threatened (05), vulnerable (01) and endangered (02) medicinal plant species. The list of rare medicinal plants includes *Aegle marmelos*, *Asparagus racemosus*, *Dillenia pentagyna*, *Emblica officinalis*, *Oroxylum indicum*, *Sterculia urens*, *Tacca leontopetaloides*, *Terminalia bellirica*, *Terminalia chebula*, *Vitex peduncularis*.

Among threatened medicinal plants, *Acorus calamus*, *Costus speciosus*, *Diospyros malabarica*, *Rauvolfia serpentina*, *Strychnos nux-vomica* represent near threatened; *Pterocarpus marsupium* vulnerable; *Clerodendrum serratum*, *Gloriosa superba* endangered status. All these medicinal plants need urgent conservation and large scale cultivation giving top priority.

**Key words**: Rare/Threatened Medicinal Plants, Santhal Pargana

Plants have been used to prevent and cure various human ailments since time immemorial. Out of the total 4,22,000 flowering plants reported from the world (Govaert 2001), more than 50,000 have been used worldwide for medicinal purposes (Schippmann et al. 2002). The World Health Organization (WHO) has estimated that 80 per cent of the world's population rely upon the traditional medicinal systems for their primary health care and 85 per cent of traditional medicines involve the use of plant extracts or their active principles (Farnsworth et al. 1985). Out of 17,000 species of higher plants reported to occur in India, 7500 are known to have medicinal importance (Shiva 1998). A large number of such higher plants having quick and intense therapeutic properties are used either in traditional system of medicine and/or as the chief source of active principles for use in modern medicine (Lavania and Lavania 1994). Although medicinal plants are fast depleting and gradually becoming threatened all over the world due to factors like habitat loss, over exploitation, improper collection, trading of plant materials, etc. More or less similar condition prevails in the forests of Santhal Pargana division (Jharkhand) also. The work done so far on this burning topic is limited to the operative threat factors and documentation of some rare/threatened taxa from this area rather than rare and threatened medicinal plants in particular (Varma and Pandey 1987, 1998, Varma et al.1989, Varma and Singh 1990, 1998, Pandey et al. 2007). In the present study, frequent field visits have been undertaken to assess the threat status and to ascertain the factors responsible for such status of medicinal plant species growing in the forests of Santhal Pargana division of Jharkhand (India).

**Study Area**

The survey has been conducted in the forests of Santhal Pargana Division which lies within the geographical limits of 23°40'-25°18' north latitude and 86°28'-87°57' east longitude in the northern part of Jharkhand state of India (Figure 1). The division is spread over in an area of 14,166 sq.km. It is now divided into six districts viz., Deoghar, Dumka, Godda, Jamtara, Pakur and Sahebganj. It is a hilly terrain covered with dry deciduous tropical forests of mixed and miscellaneous types dominated by sal tree (*Shorea robusta* Gaertn. f.). It is bounded by the river Ganga in the north, by Burdwan and Birbhum districts of West Bengal cum Dhanbad.
expected to be threatened/rare and thus selected for the present study. These medicinal plant species have been collected from their natural habitats and identified properly with the help of different floras (Haines 1961, Varma 1981). To assess threat status of medicinal plant species, the knowledgeable persons of the respective areas have been approached and enquiries have been made about various aspects of occurrence of species in the past and the changes that have occurred since then leading to the present state. The operating threat factors have been observed closely. Employing the procured information, threat assessment for individual plant species has been made as per criteria of BSI (1987-1990)/IUCN (2000). The medicinal plant species facing different degrees of threat have been assigned threat status as near threatened, vulnerable and endangered. For all these three categories, a collective term threatened has been used throughout the text of

district of Jharkhand in the south, by Birbhum district of West Bengal in the east and by Jamui, Banka and Bhagalpur districts of Bihar cum Giridih district of Jharkhand in the west. The soil is red sandy to loamy which is well suited for the growth of forests. The climate is of monsoon type and is characterized by three distinct seasons in a year.

MATERIALS AND METHODS
The forests existing within the geographical boundaries of Santhal Pargana Division (Jharkhand) have been visited frequently for last three years (June 2013 - May 2016) aiming on occurrence/threat assessment of medicinal plant species growing in their natural habitats. The medicinal plant species that have been mentioned by earlier worker(s) but are now either missing from their indicated localities or occurring in those areas in reduced population, have been

Figure1. Map showing location of study sites (1-8) in Santhal Pargana, Jharkhand: 1-Motijharna, 2-Banjhi,3-Maharajpur, 4-Jitpur,5-Sundarpahari, 6-Silingi,7-Kathikund, 8-Gopikandar. (District:A-Sahebganj, B-Godda, C-Pakur, D-Dumka, E-Deoghar, F-Jamtara)
paper. The degree of threatening follows the order as endangered > vulnerable > near threatened. The rare and threatened medicinal plant species have been arranged in alphabetic order with respect to their botanical name followed by common name/family, locality/habit, plant part/product-medicinal use(s) and threat status (Table-1).

RESULTS AND DISCUSSION

In the present study, a total of 18 medicinal plant species have been observed either as rare in occurrence or in different critical stages of threat in their natural habitats of Santhal Pargana forests. These rare/threatened medicinal plants belong to 17 genera and 15 families of angiosperms. Among these species, 11 are trees, 03 herbs, 02 shrubs and 02 climbers. Out of such medicinal plants, 10 are rare in occurrence. The threatened categories encompass near threatened (05), vulnerable (01) and endangered (02) medicinal plant species. The list of rare medicinal plants includes Aegle marmelos, Asparagus racemosus, Dillenia pentagyna, Emblica officinalis, Oroxylum indicum, Sterculia urens, Tacc a leontopetaloides, Terminalia bellirica, Terminalia chebula, Vitex peduncularis. Among threatened medicinal plants, Acorus calamus, Costus speciosus, Diospyros malabarica, Rauvolfia serpentina, Strychnos nux-vomica represent near threatened; Pterocarpus marsupium vulnerable; Clerodendrum serratum, Gloriosa superba endangered status.

The forests of Santhal Pargana (Jharkhand) have been wonderfully rich floristically in the past (Haines 1910, 1961; Panigrahi 1966). Presumably these forests might have been the natural abode of a large number of medicinal plants acting as the resource of prime importance for the health care system of tribal communities inhabiting the region. Now the medicinal plants are fast depleting from the surviving forests of the division and gradually becoming rare/threatened due to over exploitation, unsustainable harvesting, trade of plant parts, habitat destruction (mainly by deforestation, mining operations, shifting cultivation), etc. (Varma and Pandey 1987, 1998; Varma et al. 1989; Munshi and Singh 1990; Varma and Singh 1990, 1998; Singh 2003; Pandey et al. 2007; Singh et al. 2015). It is noteworthy that most of the medicinal plant species growing in this area are facing more than one threat factors at a time. It is likely that if such conditions continue to operate unchecked, the category of these species may change from rare to near threatened, near threatened to vulnerable, vulnerable to endangered and endangered to critically endangered in the near future. As such the species like Aegle marmelos, Emblica officinalis, Oroxylum indicum, Sterculia urens, Terminalia bellirica, Terminalia chebula, Vitex peduncularis, encountered earlier as depleting taxa (Varma and Singh 1998), have become rare due to continued operation of various threat factors in the forests of the region.

The rate of depletion of many wild medicinal plants has outpaced regeneration capacity with the adverse result that some of these are now facing threats of extinction and are enlisted under red category. Threatened status of many species is in alarming situation for the medicinal treasure of Santhal Pargana division of Jharkhand state. Therefore, there is an urgent need for conservation and cultivation of rare and threatened medicinal plants of the area. The large scale cultivation of such plants is necessary not only to conserve the plants but also to ease the pressure of trade in wild. Simultaneously, the attempt should also be taken to promote sustainable harvesting and to create awareness among the local people for conservation and about the depleting status of medicinal plants in the area.

The author is thankful to Prof. S.K. Choudhary, Head, University Department of Botany, T.M. Bhagalpur University, Bhagalpur for constant encouragement and facilities; Dr. T.K. Pan (Garden Superintendent) and Dr. N. Pandit (Herbarium In-charge), UDB, TMBU, Bhagalpur for help during field visits and collection; Mr. S. K. Thakur (Artist),
<table>
<thead>
<tr>
<th>Botanical name / Common name / Family</th>
<th>Locality / Habit</th>
<th>Plant part/product-Medicinal use(s)</th>
<th>Threat Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Acorus calamus</em> L./Safed bach / Araceae</td>
<td>Motijharna¹ / Herb</td>
<td>Rhizome/Root stock-Flatulence, vomiting</td>
<td>Near Threatened</td>
</tr>
<tr>
<td><em>Aegle marmelos</em> (L.) Corr. / Bel / Rutaceae</td>
<td>Motijharna¹ / Tree</td>
<td>Fruit pulp-Constipation, diarrhoea, dysentery, refreshing drink</td>
<td>Rare</td>
</tr>
<tr>
<td><em>Asparagus racemosus</em> Willd. / Satawar / Liliaceae</td>
<td>Motijharna¹ / Climber</td>
<td>Root decoction- Leucorrhoea, urinary infection Fresh tuber decoction- Diabetes</td>
<td>Rare</td>
</tr>
<tr>
<td><em>Clerodendrum serratum</em> (L.) Moon / Barangi / Verbenaceae</td>
<td>Jitpur² / Shrub</td>
<td>Root-Rheumatism, snake bite</td>
<td>Endangered</td>
</tr>
<tr>
<td><em>Costus speciosus</em> (Koen.) Sm. / Keu / Zingiberaceae</td>
<td>Motijharna¹ / Herb</td>
<td>Root decoction- Diabetes</td>
<td>Near Threatened</td>
</tr>
<tr>
<td><em>Dillenia pentagyna</em> Roxb. / Chalta / Dilleniaceae</td>
<td>Silingi³ / Tree</td>
<td>Bark decoction-Arthritis, gout</td>
<td>Rare</td>
</tr>
<tr>
<td><em>Diospyros malabarica</em> (Desr.) Kostel / Gab / Ebenaceae</td>
<td>Motijharna¹ / Tree</td>
<td>Bark-Menstrual disorder</td>
<td>Near Threatened</td>
</tr>
<tr>
<td><em>Emblica officinalis</em> Gaertn. / Amla / Euphorbiaceae</td>
<td>Banjhi¹ / Tree</td>
<td>Fruit-Vitamin C, diarrhoea, dysentery, habitual constipation</td>
<td>Rare</td>
</tr>
<tr>
<td><em>Gloriosa superba</em> L. / Daini / Liliaceae</td>
<td>Sundarpahari² / Climber</td>
<td>Rhizome-Painful delivery</td>
<td>Endangered</td>
</tr>
<tr>
<td><em>Oroxylum indicum</em> (L.) Vent. / Sona Chhal / Bignoniaceae</td>
<td>Sundarpahari² / Tree</td>
<td>Bark-Spleen enlargement Seed-Snake bite Tender fruit-Flatulence</td>
<td>Rare</td>
</tr>
<tr>
<td><em>Pterocarpus marsupium</em> Roxb. / Bijasal / Fabaceae</td>
<td>Jitpur² / Tree</td>
<td>Heart wood infusion-Diabetes, diarrhoea, dysentery</td>
<td>Vulnerable</td>
</tr>
<tr>
<td><em>Rauvolfia serentina</em> (L.) Benth. ex Kurz / Sarpaganda / Apocynaceae</td>
<td>Kathikund³ / Under shrub</td>
<td>Root-Dysentery, snake bite</td>
<td>Near Threatened</td>
</tr>
<tr>
<td><em>Sterculia urens</em> Roxb./ Telher / Sterculiaceae</td>
<td>Motijharna¹ / Tree</td>
<td>Stem bark/gum-Diarrhoea, heat of stomach, burning sensation in urinary tract</td>
<td>Rare</td>
</tr>
<tr>
<td><em>Strychnos nux-vomica</em> (L.) Benth. ex Kurz /Kuchla / Loganiaceae</td>
<td>Gopikandar³ / Tree</td>
<td>Seed powder-Diarrhoea, nervous disorder, paralysis</td>
<td>Near Threatened</td>
</tr>
</tbody>
</table>
UDB, TMBU, Bhagalpur for drawing the map; local knowledgeable persons for valuable information about various aspects of occurrence of species in the past and causal factors/changes for the present status.

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