Revegetation of coal-mine spoils using *Prosopis juliflora* in Singrauli coalfield is a harmful practice from an ecological viewpoint

Singrauli coalfield is one of the largest coal and power complexes in the world and is presently contributing about 13% of India's coal production by large mechanized opencast mines. It covers about 2202 sq. km area containing Gondwana rocks right from Talchir up to Mahadeva Formation. A major part of the coalfield (lat. 23°47′–24°12′N and long. 81°48′–82°52′E and elevation of 280–519 m amsl) lies in the Sidhi District, Madhya Pradesh and partly (80 sq. km) extends to the Sonebhadra District, Uttar Pradesh. There are eleven mining blocks in the Singrauli coalfield, which include Kakri, Bina, Marrak, Khadia, Dudhichua, Jhingurdha, Gorbi, Moher, Amlohri, Nigahi and Jayant. Marrak and Moher mining blocks are not in operation.

The tract is covered with dry deciduous forest having moderate to good density, and bears the heavy pressure of grazing and collection of firewood by local people. The forest cover consists of *Acacia catechu*, *Anogeissus latifolia*, *Butea monosperma*, *Diospyros melanoxylon*, *Bassia latifolia*, *Lagerstroemia parviflora*, *Terminalia bellirica*, *Boswellia serrata*, *Holarrhena antidysenterica* and *Dendrocalamus strictus*.

The climate is tropical monsoonal with temperature reaching up to 48°C during June and lowering down 6°C in January. Rainfall varies in the range 90–100 cm, 90% of which occurs between June and September.

Coal-mining activity results in huge dumps of overburden material known as coal-mine spoil, which is a physically, nutritionally and microbiologically impoverished habitat. This drastically disturbed system is highly prone to erosion and could cause contamination of rivers and adjoining agricultural lands with harmful substances leached out from it through rainwater. Therefore, stabilization of mine spoil becomes inevitable, which is achieved through plantation of woody species and seeding of grasses and leguminous forbs, as natural revegetation of mine spoil is a slow process.

Mining is generally followed by a revegetation programme carried by the Forest Department. In such programmes, often exotic plant species are also used along with native tree species. Since the last one and half decades an exotic tree species, *Prosopis juliflora* has gained tremendous popularity among forest officials due to its easy establishment, low mortality rate and fast growth rate on mine spoil, compared to other woody species. In a short span of time, this small tree species has formed dense stand on mine spoils. Besides this, the spines present on *P. juliflora* deter the local tribal communities, who are persistently involved in harvesting of the planted trees for fuel purposes, which has been one of the challenging problems before the Forest Department. Thus, plantation of *P. juliflora* has solved this problem to some extent.

P. juliflora is an evergreen tree species native to Central America. This deep-rooted plant is highly tolerant to water stress, soil salinity and sodicity. The plant generally reproduces through seeds. It spreads fast, replacing the native flora. In Gujarat, *P. juliflora* has attained the form of a noxious weed invading grasslands, agricultural lands, sanctuaries and other terrestrial habitats, causing tremendous loss of biodiversity. Absence of natural enemies like insects and diseases are the two important factors responsible for its spread.

In Singrauli coalfield it is a common observation that after plantation it monopolizes the mine spoil, as a result of which other plant species fail to flourish at the plantation site. Thus this exotic tree species checks the biodiversity. The spiny nature of the tree also deters wild animals to take shelter in the plantations of *P. juliflora*.

Young and mature unplanted *P. juliflora* plants can easily be noticed on naturally revegetated or revegetated mine spoils (with other species) or at bare sites in the mine area, indicating that this exotic flora is gradually turning itself to a weed form in the coalfield area, which is indeed a matter of great concern.

Thus plantation of this exotic tree species merely for the sake of greenery is a disastrous exercise from an ecological viewpoint, as the plant could cause heavy loss to the biodiversity of the region. Furthermore, this plant could invade the nearby belt of the tropical dry deciduous forest, hindering the natural regeneration of native forest species and thus perturbing the ecology of the forest ecosystem. Besides this, the plant has the ability to deplete the sub-soil water due to its deep-rooting habit thus causing the lowering of groundwater table in the locality. Therefore, it is the need of the hour to put a ban on the plantation of *P. juliflora* on mine dumps of the Singrauli coalfield. In addition, there is also a need to destroy older plantations for restoration of biodiversity and also to check its dissemination in the locality. Thus the native trees belonging to deciduous forest of the locality should be the preferred choice for revegetation of mine spoils for sustenance of the ecology and environment of the Singrauli region.

ARVIND SINGH

Department of Botany,
Banaras Hindu University,
Varanasi 221 005, India
e-mail:arvindsingh_bhu@yahoo.com