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Cassia tora and *Cassia obtusifolia* as characteristic species of uranium mineralization

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SUMMARY

In Rajasthan certain uranium deposits are present in Bhilwara, Sikar and Udaipur district. In Udaipur the deposits are present in Udaisagar, Haldughati and Umra areas. In present investigation Umra area is explored for phytosociological studies. It is situated at 24^0 31' N longitudes and 73^0 48' E latitudes. Four features of the plant community, Constancy (Oosting 1956), Fidelity (Braun-Blanquet, 1932 and Oosting, 1956), Sociability (Braun-Blanquet, 1932) and Cover-Abundance (Braun-Blanquet, 1932) were studied at Umra. The study reveals that *Cassia tora* L. and *Cassia obtusifolia* L. (Caesalpiniaceae) have high degree of constancy (3), fidelity (4), Sociability (3) and cover- Abundance (3). These two species of *Cassia* might be "Characteristic species" in those areas. The study reveals that the use of vegetation as a guide may be useful for prospecting newer mineral deposits.

Key words : Uranium, Geobotanical prospecting, Constancy, Fidelity, Sociability, Cover Abundance, *Cassia tora* L., *Cassia obtusifolia* L.

There has been renewed interest in the use of vegetation as a guide to mineralization. The use of plants as guides to areas worth exploiting for their mineral deposits has developed in to two clearly defined methods known as 'biogeochemical prospecting' and 'geobotanical prospecting' (Jain, 1996).

Biogeochemical prospecting is depends on chemical analysis of vegetation in which reliance is placed on the accumulation of elements from the substrate to an extant proportional to the amount present (Brooks, 1971). The biogeochemical methods have also been called 'the ash method' (Tkalich, 1938) and 'soil floristic method' (Malyuga, 1964).

Geobotanical surveys rely on the recognition that certain plant species are always, or almost always, associated with substrates enriched with certain elements. The distribution of such species is so restricted that mere presence provides a reliable indication of the occurrence of abnormally high concentration of elements in the soil and in many cases the underlying rocks. Within the science of the vegetational cover there has gradually developed a special branch 'indicator geobotany', which is concerned with the theoretical principles and applications of he vegetation cover and its component species as indicators of the conditions of the environment (Jain, 1996).

Most of the above work is carried out in former Soviet Union (Malyuga, 1964) though some work is being, or has been carried out in the United States (Canon, 1960a and b) and New Zealand (Brooks, 1968). Surprisingly very few studies have been carried out for this highly valuable element in India. There is a need to delineate newer uranium deposits especially by the use of green plants that remain buried under thickness of soil and barren rock.

The only uranium mine in India is located at Jaduguda in Singhbhum district of Jharkhand. In Rajasthan certain uranium deposits are present in Bhilwara, Sikar and Udaipur districts. Around Udaipur, deposits are present at Udaisagar, Haldu Ghati and Umra areas.

The radioactive mineral deposit of Umra lies 18 km in south east of Udaipur City. It is situated at 24^0 31' N longitudes and 73^0 48' E latitudes. Topographic map of Umra is shown in figure 1. Umra mine was in operation between the years 1957 to 1962. A portion of the old mining shaft is shown in figure 2. A huge heap of uranium mining waste has been lying on the western flanks of Umra and only a few plan species are growing on its outskirts (Fig. 3).

The purpose of the present study was to find out plant species, which provides a reliable indication of the occurrence of abnormally high concentrations of uranium in the soil and underlying rocks.

MATERIALS AND METHODS

A detailed phytosociological study was conducted at Umra of Udaipur district. In the present study four features of the plant community constancy (C), fidelity (F), sociability (S) and cover-abundance (CA) were determined.

Constancy is the degree to which a species constantly occurs in a community. Oosting (1956) have distinguished a 5-degree scale for constancy as follows.

1 = Rare (in 1 to 20 percent of the stands)
2 = Seldom present (in 20 to 40 percent of the stands)
3 = Often present (in 40 to 60 percent of the stands)
4 = Mostly present (in 60 to 80 percent of the stands)
5 = Constantly present (in 80 to 100 percent of the stands).

Fidelity is the degree of exclusive occurrence of a species in a community. Fidelity grades or classes of the species of a community have been expressed by a five-degree scale (Braun-Blanquet, 1932 and Oosting, 1956) as under.

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