GENERAL REMARKS

The eighty-fifth volume of *IARC Monographs* considers betel-quid and areca-nut chewing, and some areca-nut-derived nitrosamines. Betel quid generally consists of betel leaf (from the *Piper betle* L. vine), areca nut (from the *Areca catechu* tree) and slaked lime (calcium hydroxide), to which tobacco is often added. Other ingredients and flavouring agents can be included according to local preferences and practices. Betel-quid and areca-nut chewing are widely prevalent in many parts of Asia and in Asian-migrant communities elsewhere in the world. Global reports estimate 600 million users (Trivedy, 2001), making areca-nut chewing the fourth most common habit after consumption of tobacco, alcohol and caffeine-containing beverages (Marshall, 1987; Sullivan & Hagen, 2002). Betel quid is chewed for many reasons, including for its psychostimulating effects, to induce euphoria, to satisfy hunger, to sweeten the breath and as a social and cultural practice that is strongly entrenched in people's day-to-day life.

The chewing of areca nut is a habit of great antiquity. In one study, dentitions of 31 individuals excavated from the Bronze Age site of Nui Nap, Thanh Hoa province, Viet Nam, were examined for the presence of areca-nut residues. The teeth appeared to be stained by betel-quid use (Oxenham *et al*., 2001). Also, the chewing of areca nut is mentioned in Sanskrit manuscripts, *Sushruta Samhita,* believed to have been written around 600 BC near Benares (Bhishagratna, 1907). The Sanskrit name for the leaf of the betel vine, '*tambula*', persists in modern Hindi (Gode, 1961), as '*tambuli*', and is unchanged in Arabic and Persian (Muir & Kirk, 1960).

There seems to be general agreement that the first mention of betel quid as such dates from 504 BC when it was recorded in the 'Mahawamsa', a register of events in Ceylan written in Pali, that a princess made a gift of betel to her nurse (Krenger, 1942). A story is told about the wife of a Singhalese minister who, in about AD 56, learning of a conspiracy against her husband, sent his 'betel, etc., for mastication, omitting the chunam [slaked lime] hoping that, in coming to search for this missing ingredient, he might escape his impending fate' (see Tennent, 1860). Masudi, the traveller from Baghdad who wrote an account of his voyages in AD 916, stated that the chewing of betel then prevailed along the southern coast of Arabia, and reached as far as Yemen and Mecca (Krenger, 1942). In 1298, Marco Polo (Raghavan & Baruah, 1958) wrote in his travelogues 'the people of India have a habit of keeping in their mouth a certain leaf called the 'tembul'' (Krenger, 1942). The habit is known to have reached the Zanzibar coast between AD 1200 and 1400,

and mention is made in Dutch archives from 1664 of a tax on betel leaf imported from India to Malacca (West Malaysia). In 1703, the importation was forbidden, presumably to protect local growers rather than to prevent a well-established habit (Muir & Kirk, 1960).

Tobacco was introduced into India by Europeans in the sixteenth century as a smoking substance. With acceptance and widespread use in royal courts, it found an acceptance in the general population and was mixed with betel quid. As betel quid chewing was a socially accepted practice, the use of betel quid containing tobacco became a widespread habit.

The first reference to betel chewers' cancer was made by Tennent (1860). He mentions in a footnote that 'Dr Elliot of Colombo observed several cases of cancer in the cheek, which from its peculiar characteristics, he designated the 'betel chewer's cancer''. Other early references include those of Bala Ram (1902), Niblock (1902), and Boak (1906), writing from Malabar, Madras, the Sulu Archipelago and British Borneo, respectively, about the chewing of betel quid alone or with tobacco.

While in the Americas, Europe and Oceania, the leading cancers are those of the lung, breast, prostate and colorectum, in India and many other countries in South-East Asia, oral cancer is a leading type of malignancy. In South Central Asia, cancer of the oral cavity is the cancer with the highest incidence among men and the third highest among women (after the cervix and breast) in 1975 (IARC, 1985), and this still held true in 2002 (IARC, 2003).

Betel-quid chewing, with and without tobacco, was considered in the thirty-seventh volume of the *IARC Monographs* (IARC, 1985). Sufficient evidence of carcinogenicity was found for betel quid with tobacco, but the evidence then available was inadequate for betel quid without tobacco. Since that time, several epidemiological studies have become available from areas of the world where tobacco generally is not added to the betel quid. In addition, some recent epidemiological studies in India and Pakistan have been able to separate the effects of betel quid with and without tobacco.

In addition, a large body of evidence has arisen from studies in experimental animals and in-vitro studies that investigated the effects of areca nut alone, as well as those of betel quid with or without tobacco.

In recent years, a variety of mass-produced, prepackaged areca-nut products have become available in many countries around the world. Aggressive advertising, targeted at the middle class and at children, has enhanced the sales of these products. The commercial value of the market for these prepackaged products in India alone is estimated at several hundred million US dollars annually. These products have led to serious public health problems in terms of increasing incidence of oral submucous fibrosis among younger age groups. As a result, several governmental agencies have put regulatory restrictions on these products.

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