

allusions and imagery from the Upanishads and the Puranas. The seeds have germinated, sprouted and grown into a sturdy, all-uncompassing, spiritual tree.

The other works of the author like “Madhuram Gayathi”, a fantastic allegory fusing mythology, spirituality and ecology and “Pravachakante Vazhi” with its reiteration for prophethood for providing soothing touches to our existential wounds, and his numerous short stories with its spiritual imagery and meditative and philosophic undertones, also confirm the spiritual metamorphosis in Vijayan.

His latest novel, ‘Thalamurakal’, a fictionalised account of his and his family’s history has ‘Chamiyarappan’ as its protagonist who begins as an atheist and ends as a spiritually convinced person. A certain positive fatalism is felt through out the novel. Vijayan does not try to justify the ways of God to man, as Milton did, but shows God’s ways to man.

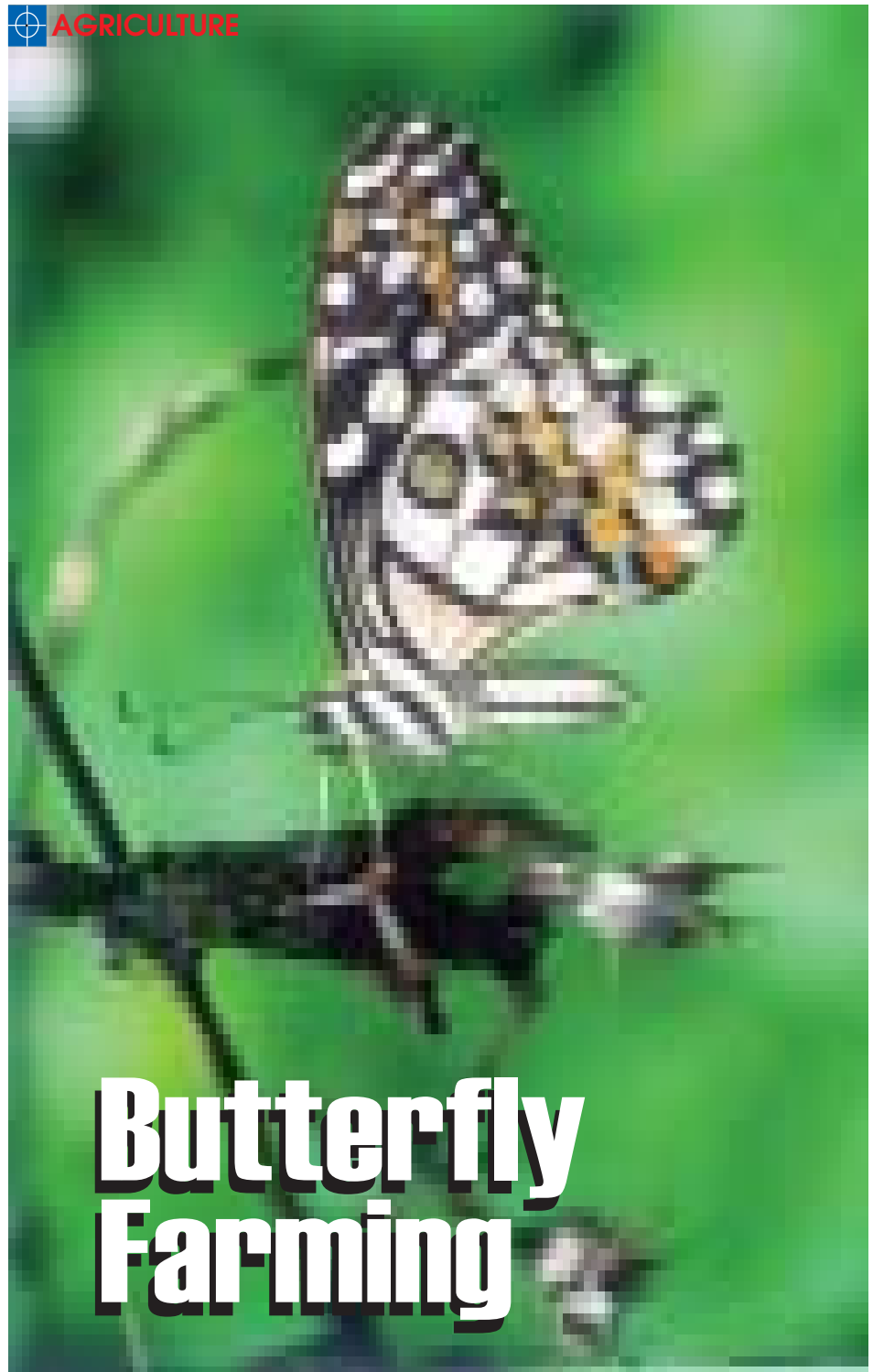
As a man and as an author as well, Vijayan is blessed with an intense inner life. With all turbulences and emotional storms, his lifeboat eventually reaches anchorage off the calm and peaceful shores of self-knowledge. Even the storms and turbulences of life are capable of manifesting Guru’s infinite grace.

Another striking thing about Vijayan’s is his concerns. They remain human and humane as ever. Even in his committed Communist days, his concerns refused to be dictated by any ‘ism’. His post-revolutionary disappointment too cherished the same concerns. The only difference is that they have undergone a qualitative change and that they have acquired metaphysical dimensions.

Thematically, the most important factor in the writings of O.V. Vijayan is the holistic vision of Vedanta. It has yet to be meaningfully looked into, especially in the light of Indian spiritual and critical traditions. Vijayan’s search for truth, unlike that of many of his coevals is a solo one. The search becomes impregnated in the cosmic answer, which the ‘perennial philosophy’ of India always sought to know.

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 **AGRICULTURE**



Butterfly Farming

Dr.P.K.Sumodan

Considering the rich fauna of the colourful insects Kerala opens tremendous potentiality in butterfly farming.

The great Malayalam poet Kumaran Asan described butterflies as 'flowers with wings'. This is perhaps the most perfect verbal expression of the beauty of these wonderful insects. The variety of colour combinations in the world of butterflies is comparable only with that of the flowers. Now many American weddings have some -of these special flying guests to add exotic fervour to the occasion! Releasing live butterflies at weddings and other special occasions is fast becoming a status symbol in many North and South American countries, replacing the traditional confetti, rice and balloons. In the USA there are commercial butterfly dealers like 'Amazing Butterflies' in this new business. A dozen 'monarch butterflies' cost around \$ 95. The price tags for other varieties range from \$ 85 to \$ 100. The tiny Central American country Costa Rica is the major player in this emerging industry .Other countries active in this business are Malaysia, Philippines, Thailand, Taiwan, Kenya, Madagascar, United States and El Salvador. Surprisingly India with about 1500 species of butterflies doesn't figure in the list. In the era of globalisation, we should explore non-traditional avenues of employment generation and foreign exchange earning in order to withstand its negative impact on traditional income resources. Butterfly farming would be one of the options with tremendous potential especially in Kerala with its rich fauna of these colourful insects.

What is Butterfly farming?

The rearing of butterflies and moths is not a new commercial activity. The silk industry, based on rearing a moth (the less colourful relatives of butterflies) *Bombyx mori*, has been in existence for thousands of years. In India Karnataka is the leader in this industry .Though Kerala also has equal potential as its neighbour, we are late starters in this highly profitable industry .In the U .K. breeding of butterflies for public viewing in butterfly gardens has been a serious commercial activity since 1977.

Interest in the butterflies became a serious vocation for many people in the West during the Victorian era, roughly



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1860-1910. At that time members of the English aristocracy, endowed with wealth and leisure derived from the United Kingdom's flourishing global empire, collected, identified and catalogued butterflies from all over the world.

As mentioned above Costa Rica leads in this specialised farming. Local species of butterflies are used for farming. The following steps are involved in the butterfly farming in that country .First of all, a suitable habitat is created by planting food plants in abundance on the farm and in the vicinity. With the development of these plants, the farm becomes a butterfly sanctuary by providing sufficiently abundant food for the caterpillars and nectar for the adults.

Next step is to collect female butterflies either from the wild or from captive bred stock, and release them to fly freely within large enclosed structures that house the required food plants. As each butterfly species requires a specific host plant for its survival, the farmer must anticipate the species that he or she intends to breed by planting the necessary plants well in anticipation. In Costa Rica a typical flight area measures about 25 sq. meters by 3 meters high, though there are no optimal dimensions. A fresh female butterfly normally lay about a hundred eggs or more. Some species lay their eggs singly over many days. Others lay gregariously in a few sittings.

Once the eggs are laid they must be removed daily from the flight areas and placed in a secure location where predators (ants, spiders, wasps, parasitic wasps, lizards, etc.) cannot get to them. The females of all species lay only on their respective host plant. Furthermore, each species has a preference as to where the females lay their eggs. While one species lay on the underside of old and dried leaves, another lay only on the tendrils of the freshest new growth. With some experience, a person can quickly discover the best places to look and make quick work of collecting the eggs.

The first stages (instars) of caterpillars, which come out from the eggs are placed on potted food plants, which in turn are placed inside cages. During the first two weeks (the first three stages or instars) the caterpillars eat very little. After their third instar, the larvae become voracious. Because of the increased volume of food plant that each larva consumes, it becomes impractical to feed them on potted plants. Rather, they must be fed on cuttings. Generally, a fistful or two of the food plant is cut for each cage. The stems are placed in ajar of water to preserve the freshness of the leaves for 24 hours. The larvae are then placed on the cutting to feed as they wish. The cages must be cleaned daily. This entails removing the stems of the devoured food plants from the previous day; removing the excrement from the floor of the cages; inserting new, freshly

cut host plant; and returning the larvae on to their plants. Maintaining cleanliness is very important. Failing this, even for one day, the larvae are likely to die from an assortment of diseases or Starvation. When rearing just a few or thousands of larvae, cleanliness and attention to details are indisputably a key success factor for any butterfly breeding operation. Once completed their fifth and final instar, the larvae pupate. They may attach themselves as pupae on the ceiling of the cages or on the food plants. As the pupae are usually of such short duration, only by collecting the pupae daily can a farmer be sure of the age of the pupae. In Costa Rica, a pupa should not be more than three days old before it is exported. Butterfly farming is by no means an easy endeavour. In the wild, butterflies may expect to enjoy a 2% survival rate between egg and adult. The 98% that perish along the way may be devoured by prey, succumb to diseases to or not be able subsist if the climatic conditions (drought, wind, “temperatures, etc.) are not right. A successful farmer may be able to raise the survival rate from 2% to as high as 90%.

Market for butterflies

Butterflies are sought by at least three categories of customers in Europe and Americas.

Butterfly collectors

Collection of butterflies has always been a popular hobby. Some collectors breed butterflies from all over the world in their backyards. They obtain live butterflies from the venders who in turn import them from other countries. They not only enjoy the beauty of butterflies but also derive happiness by observing their wonderful life history .Others are like stamp collectors and go for dead butterflies available with the butterfly dealers.

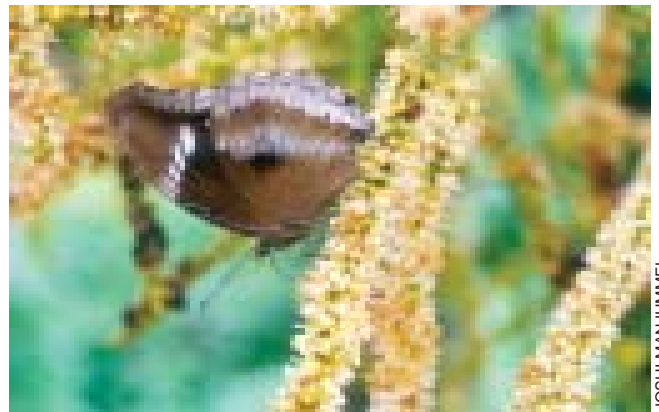
Butterfly exhibitors

In 1977 a man living on the island of Guernsey in the English Channel was concerned about the sagging tourist

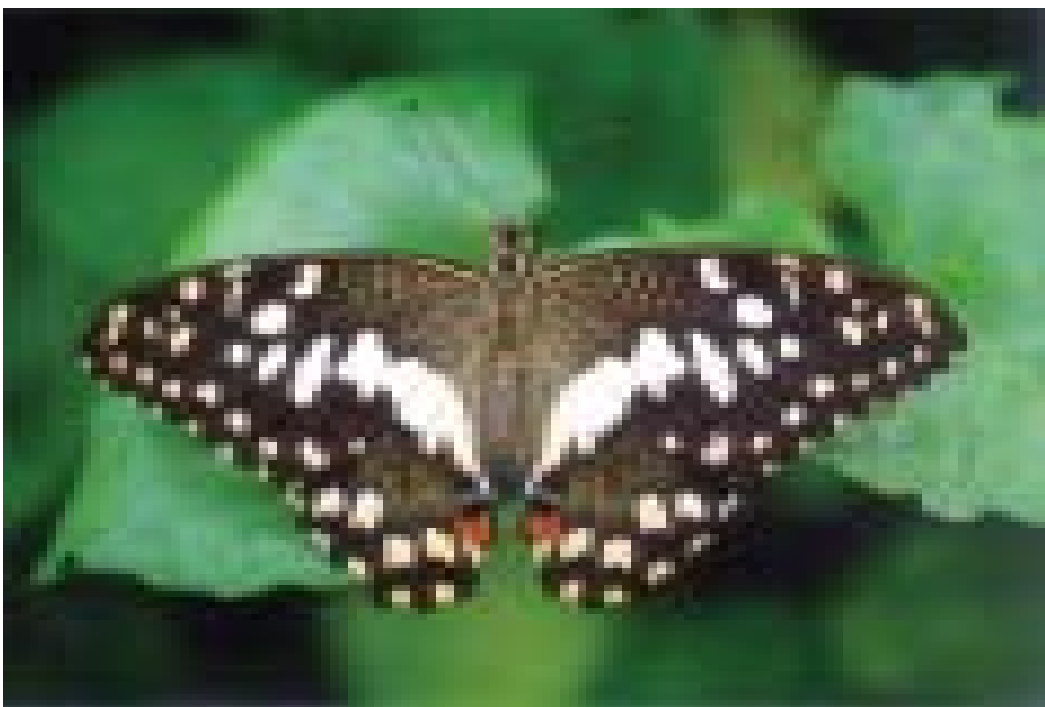
industry .It was this individual’s idea to acquire a vacant greenhouse and fill it with tropical plants to recreate the essence of a tropical jungle. To add interest, colour and movement, he thought to import some live butterflies acquired from Asia through a member of the hobbyist’s association. The resulting enclosure, complete with waterfall and meandering brook was publicized as a butterfly exhibition and opened to the public. Needless to say, the project was an enormous gamble. No one had ever shown live tropical butterflies to the public. How should a butterfly exhibit be arranged? Which plants should be acquired and from where? What would the ideal temperature and humidity setting be?



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Kerala is one of the eighteen 'biodiversity hot spots' of the world. There are about 330 species of butterflies in this green state. The state also has an ambient climate for setting up profitable butterfly farms.

Perhaps one of the most serious questions was how one goes about acquiring live butterflies. In 1977 there were no professional butterfly farmers in the tropics. There were only amateur hobbyists who were rearing and selling a few dozen butterflies at a time. The challenge of acquiring a thousand healthy, live tropical butterflies was a daunting one indeed. To many people's amazement, and in spite of all the initial problems, this man's butterfly exhibit was a commercial success. In fact, as other exhibits were established in Guernsey's wake, the butterfly exhibit concept quickly acquired a favourable reputation in the venture capital circles. From about 1980 until 1988

the live butterfly exhibit industry exploded in the United Kingdom. Typical of a fast-growing novel industry, the butterfly exhibits attracted a broad range of entrants. In the absence of industry regulation and a self-policing mechanism, the industry was fraught with shoddy exhibits. While some entrepreneurs invested with the aim of maximizing the public's enjoyment and seeking long-term profits, others developed their exhibits with minimal investment to maximize their short-term gains. One example of the latter approach is the exhibit owner who would pin dead butterflies onto the flowers in the interest of economy. The exhibits in Europe are mostly supplied by butterfly brokers. Whereas in 1980 there was only one full-time professional distributor of live butterflies, a company outside of Birmingham, England called Entomological Livestock Supplies, today there are many in Western Europe. These people import butterfly pupae from around the world and then mix and match the pupae to supply the needs of each of the exhibits they supply. Because butterfly pupae are highly perishable - a typical pupa will last about 10 days before the butterfly emerges - time is of the essence. The pupae are transported by door to door courier service from the country of origin to the distributor and then repackaged and shipped within hours.

In the US more than a dozen major exhibits are operating today and several more are planned or under construction. North America's largest butterfly exposition, The Niagara Parks Commission's (Ontario) Butterfly Garden, is a \$15 million dollar facility and was opened in December 1996 and attracts around 20,000 visitors on weekends.

Butterfly releasers

As discussed earlier, another growing market for live butterflies is for butterfly releases. Increasingly, people of means are purchasing large numbers of butterflies for

release at weddings and other special occasions. In Costa Rica, members of the country's legislature recently took part in a butterfly release as part of a fund raising event for street children. As each legislator released a butterfly, he would call out aloud the name of a child. The butterfly he released represented the life and aspirations of that child.

Potentials of Kerala

Kerala has a few positive features for a successful butterfly industry. The first and foremost is its rich diversity of butterfly species. Kerala is one of the eighteen 'biodiversity hot spots' of the world. There are about 330 species of butterflies in this green state. The butterfly fauna of the state includes the largest Indian butterfly, the Southern or Western Ghats Birdwing (*Troides minos*) with a wingspan of about 25 cm. The state also has an ambient climate for setting up profitable butterfly farms. Added to these natural gifts, we have three international airports in the state, which would help in the fast transportation of butterfly pupae around the world. Now what is required is a Governmental initiative. The initial step in this regard should be sending a suitable delegation to Costa Rica to study the complete details of this emerging industry.

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