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Design and development of a reversible and removable blade type rubber tapping knife

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The productivity of rubber can be increased if the tappers engage in tapping using appropriate tools and knowledge of the internal structure of the rubber trunk. Due to lack of skills in handling a conventional *Miched* tapping knife, the tappers damage the bark and reduce the economic lifespan of the rubber tree. To resolve this problem, scientists introduced deferent types of tapping devices with many accessories. Unfortunately they were not successful. To improve the quality and efficiency of tapping, a reversible and removable blade type tapping device was designed and fabricated. Our final intention is to fabricate a safer and low cost rubber taping device. (Patent No: 15251).

A newly designed manually operated rubber tapping knife, consisting of a removable and reversible steel blade with reversible two ways, angle shaped cutting edges, with upper and lower blade holding jaws attached to the front side of the handle, a steel handle with anticoagulant storage tank, scraper to clean the coconut shell, dried latex removing blades attached to the rear end of the handle and cambium protector with a bark depth controlling unit. Working capacity (time/plant), latex yield, quality of tapping panel, farmer satisfaction and the cost of production were considered as criteria of evaluation of the tapping knife. Testing was done at Yatiyana area in the Matara District.

Working capacity of the designed reversible tapping knife and a conventional knife are 2.21 and 2.52 s/plant respectively. It difference between these two was not significant. Average latex yield of designed tapping knife and conventional tapping knife are 150.2 ml and 125.7 ml per plant respectively. Therefore it was observed that the yield per plant using the designed tapping knife is 20 % higher than the conventional knife. Additionally the tapping knife has several advantages. The removable steel blade is fixed to the middle of upper and lower blade holding jaws by small butterfly screws and nuts. When the blade is worn out, it can be replaced easily at a low cost. In additionally the tapper can carry extra blades with him to replace.

The reversible two ways cutting edges of the blade are consisted of two left side cutting edge and two right side cutting edges. Therefore, when the blade is worn out, the operator can change the side of the blade as and when it is necessary in the field. It has a handle with an anticoagulant storage tank and a scraper to clean the coconut shell. The scraper has two left and right cleaning edges to remove the dry latex (ottapalu) on the earlier tapped panel. The cost of production of the conventional knife and designed knife are Rs. 475 and Rs. 500 respectively. The designed tapping knife has received high appreciation and satisfaction by local tappers. It is beneficial for the local farmers due to low cost of production, durability and high performances. In addition, it can be easily fabricated by a local blacksmith.

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