Evolutionary changes in ground spraying technology for disease management In rubber plantations-An overview

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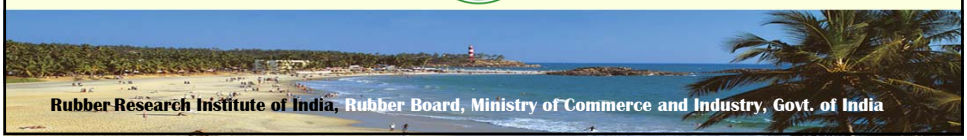
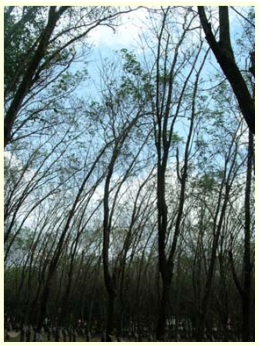


Natural rubber in all stages of its growth is affected with various pest and disease, leading to either retardation of growth or reduction in yield.

Timely management of this biotic stress is an important step towards the sustainable production and productivity.



Various equipments and devices were developed for the application of chemicals to control pests and diseases

Abnormal Leaf Fall (ALF) was the first research challenge addressed by the rubber researchers in India	First recommendation for control of ALF using Bordeaux mixture(0.75%) came from this research station in 1921	The first research station in India was started at Mundakayam, in the southern part of the country to address the problem of *Phytophthora* disease

Application of 1% Bordeaux mixture was recommended by the Rubber Board in 1950

Both high volume and low volume spraying devices are being used now either for prophylactic or curative application of pesticides in rubber plantations

Development and introduction of these devices and equipments have a history same that of rubber cultivation

Progressive developments and changes taken place in the spraying technology during the last few decades are outlined in this presentation

Devices studied

High volume sprayers
Knapsack Sprayers
Rocker Sprayers

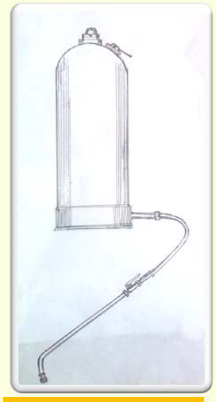
Low Volume Sprayers
Mist Blowers
Mist Blower cum Dusters
Tractor Mounted Mist Blower
Single man Carrying Mist Blower

Lances
Bamboo pole lances
High jet lances
SPG spray gun
Telescopic lance

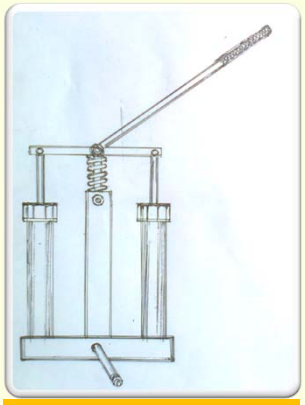
DEVELOPMENTS IN HIGH VOLUME SPRAYERS

DSP Charge pump: introduced during 1920's

A pump consisting of a pressure retaining chamber which could be attached to a separate charge pump was initially used for high volume spraying



Fungicide tank



Pump unit

Knapsack Sprayer (Cylindrical Type)

Year of introduction :1970

Features :

Manually operated Working pressure : 40 psi

Tank capacity : 9 ltr. - 13 ltr (available)

Usefull for spraying 1 – 2 year old plantations

Back pack Sprayer

Year of introduction :1970

Manually operated

Working pressure : 40 psi

Tank capacity : 13 ltr

Use full for spraying 1 – 2 year old plantations

Battery Operated Sprayers(VBD09)

Introduced in the year : 2011
Tank capacity : 16 ltr

Battery : 12 Volt, 7.0 AMP- Sealed lead acid

Pump : Electric motor operated 12 Volt, 2.6 lit/min discharge @40 psi

Pump materials of construction : Polypropylene pump body, viton valves, santoprene diaphragm

Working pressure : Low pressure - 30 psi, High pressure - 40 psi

Length of lance : 100 cm

DSP Rocker Sprayer (Double side Suction pump)

Year of introduction : 1923

Features :

Reciprocating type

Double cylinder with common doom type pressure vessel

Useful for immature and mature plants

Working in hydraulic pressure

Working pressure is 140 psi

Delivery - Single/double bamboo lance

Foot Operated Sprayer

Year of introduction : 1960

Features :

Vertically fitted single cylinder with a cylindrical type pressure vessel

Useful for immature and mature plants

Working in hydraulic pressure

Working pressure is 140 psi

Delivery - Single/double spray lance

Rocker Sprayer

Year of introduction **: 1960.**
Features :
Reciprocating type

Single cylinder with a doom type pressure vessel

Useful for immature and mature plants

Working in hydraulic pressure

Working pressure is 140 psi

Delivery - Single/double high jet spray oil

Year of introduction **:1990.**

Features :

Reciprocating type

Single/Double/Triple pistons HSP,HDP,HTP)

Working pressure is 400 psi

Useful for mature plants

Engine : 3.5 hp Petrol / kerosene

Motorized rocker sprayer

Delivery - Single/double Dunlop type high pressure withstanding rubber hose (12 ltrs/min/piston)

Lance : Spray Gun

DEVELOPMENTS OF LOW VOLUME SPRAYING

Micron 420 (BSA)

Introduced for spraying in rubber: 1957.

Features :

Engine : BSA, 250 cc, Petrol, 4 stroke, 3.5 HP

Blower : Metallic type – volute

Impeller : Paddle type casting

Capacity of fungicide tank : 10 ltrs. Cylindrical metallic tank

Spray height : 60ft

Weight : 120kg

Eight persons for spraying

Mistral AB 24 Duster cum Sprayer

Year of introduction : 1970.

Features :

Capacity of sulphur dust tank : 12 Kg.

Engine : 250 cc, Petrol, 4 stroke 3.5 HP

Blower : Metallic type - volute 5 mm thick metallic plate used

Impeller : Paddle type large diameter and width of each plate (Paddle) is 3" casting

Capacity of fungicide tank : 10 ltrs.

Weight : 85kg

Hung type four persons for spraying

SHAWALLACE Duster cum Sprayer

Year of introduction :1970

Features :

Capacity of sulphur tank : 13 Kg.

Engine : 250 cc, Petrol, 4 stroke 4.5 HP, Enfield MK25

Blower : Metallic type - volute thin metallic plate used

Impeller : Paddle type with casting alloy

Capacity of fungicide tank: 13 ltrs. Plastic tank

Spray height: 60ft Weight : 80kg Four persons for spraying

SKODA Micro Spray Power 400

Year of introduction : 1980.

Features :

Engine : 250 cc, Petrol/Kerosene, 4 stroke 3.5 HP, Greaves MK 45

Blower : Metallic type - volute thin metallic plate used

Impeller : Paddle type with casting alloy

Capacity of fungicide tank : 13 ltrs. Plastic tank

Capacity of sulphur dust tank: 15 Kg.

Spray height : 65ft

Weight : 70kg

Four persons for spraying

Aspee Turblow Mist Blower cum Duster

Year of manufacturing : 1970.

Features :

Engine : 250 cc, Petrol, 4 stroke 3.5 HP, Enfield MK 25

Blower : Fiber glass body - volute type

Impeller : Paddle fins type with cages aluminium alloy

Capacity of fungicide tank : 13 ltrs. Plastic tank

Capacity of sulphur dust tank : 15 Kg.

Weight : 60kg

Spray height : 60ft

Four persons for spraying

Year of introduction :1990.

Features :

Engine : 256cc, Petrol, 4 stroke/Kerosene 3.5 HP, Villier's MK 45

Blower : Bonded plastic body - volute type

Impeller : Fins type with cages stainless steel (48fins)

Capacity of fungicide tank : 13 ltrs. Plastic tank

Capacity of sulphur tank : 22Kg.

Weight : 65Kg

Spray height : 65ft

Four persons for spraying

Aspee Turblow Sprayer cum Duster

Aspee Turblow Sprayer cum Duster with Honda engine

Year of introduction : 2006

Features :

Engine : 256cc, Petrol, 4 stroke/Kerosene 4.5 HP, HONDA GK 300

Blower : Bonded plastic body - volute type

Impeller : Fins type with cages stainless steel (48 fins)

Capacity of fungicide tank : 13 ltrs. Plastic tank

Capacity of sulphur tank : 22 Kg.

Weight : 55 kg

Delivery height : 70 feet.

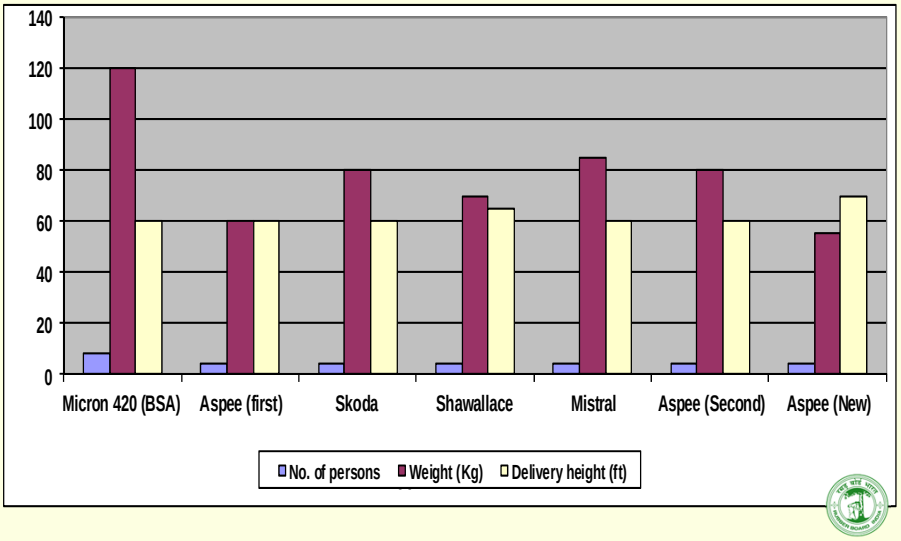
Four persons for spraying

Modification in Aspee Turblow Sprayer

Fins of the atomizer was modified as adjustable in various angles

Modified atomizer

Comparisons of parameters of different mist blowers



Tractor mounted sprayers

Old version Introduced in 1995

Specifications:

3-cylinder, 4-stroke diesel engine

Height : 1.475 M

Width : 1.025 M

Length : 2.565 M

Gear : 6-Speed forward and 2-Speed reverse speed of 1.2 KM/hr

PTO Shaft rpm : 500

Blower assembly : volute, fibre glass

Impeller : 84 fins- 12 hp in 3000rpm

Delivery height : > 90 ft.

Mini Tractor mounted mist blower

Single man carrying mist blowers

Microflex sprayer

With rotary atomizer

Introduced during 90's
Delivery height: <30 ft.
Fungicide pump: driven by belt

Oleo Mac (AM162)

Year of introduction: 2011

Weight : 11 Kg

Engine : 2 stroke petrol with 3.5 Hp in 6000 rpm

Blower : Plastic Volute type

Impeller : Paddle type Plastic

Booster pump : for efficient discharge

Height reach : 45 feet

STIHL (SR420)

Year of introduction: 2011

Weight : 11 Kg

Engine : 2 stroke petrol with 3.5 Hp in 6000 rpm

Blower : Plastic Volute type

Impeller : Paddle type Plastic

Booster pump : No booster pump, air by-passing system for efficient discharge

Height reach : 50’

Aspee (AMB/85H)

Year of introduction: 2011

Weight : 14 Kg

Engine : 2 stroke petrol with 4.5 Hp in 6000 rpm

Blower : Plastic Volute type

Impeller : Paddle type Plastic

Booster pump : for efficient discharge

Height reach : 52’

Dusting : Under processing