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PATENT SPECIFICATION

803,772



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International Classification:—A61L C05f.

COMPLETE SPECIFICATION

Improvements in Systemic Herbicide Compositions

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We, THE BRITISH RUBBER PRODUCERS' RESEARCH ASSOCIATION, a Body Corporate duly organised under the Laws of Great Britain, of 19, Fenchurch Street, London, E.C.3, do hereby declare the invention (a communication from Edwin Denis Clifford Baptist, a British Subject, and Petrus de Jonge, a Dutch Subject, both of the Rubber Research Institute of Malaya, Kuala Lumpur, Federation of Malaya), for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

15 This invention relates to compositions suitable for the treatment of rubber bearing Hevea for the purpose of stimulation of yield and/or bark renewal.

20 Selective systemic herbicides comprise substances which, on application, become absorbed in the system of a plant, and above certain concentrations may cause its death. These compounds are growth regulating substances and according to the way in which they are applied may be expected to produce various specific results.

30 The invention provides improved compositions suitable for treating rubber-bearing Hevea for the stimulation of yield and/or bark renewal and not capable of forming stable dispersions in aqueous media including a lower alkyl ester of 2,4,5-trichlorophenoxyacetic acid in which the alkyl group contains up to five

carbon atoms dissolved in vegetable oil or a mixture of vegetable oil and palm oil sludge or a mixture of vegetable oil and mineral grease.

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The efficacy of such compositions containing such esters of 2,4,5-trichloro-phenoxy-acetic acid as a yield stimulant to rubber trees has been well demonstrated in our experiments, as shown in the following examples. First, illegitimate seedlings of clones Pilmoor A44, B50, B58 and of mixed MAP clones planted in December 1931 in Field 14E of the R.R.I. Experiment Station and tapped on the half spiral alternate daily system (S/2.d/2.100%) were used to compare with untreated controls the efficacy as yield stimulants of a proprietary mixture which we have designated as mixture A, 2,4-dichlorophenoxy-acetic acid (2,4-D) and 2,4,5-trichlorophenoxy-acetic acid (2,4,5-T).

The first application of the treatments on a newly opened panel of first renewal bark was made in November 1952 on a three inch strip of lightly scraped bark below the tapping cut. The sodium salts of 2,4-D and 2,4,5-T were used at a 1 per cent concentration as emulsions in commercial palm oil and the results for the first six months, presented in TABLE I as mean monthly yields of dry rubber in grams per tree per tapping, and secondly as a percentage in brackets of the control, show the superiority of 2,4,5-T over 2,4-D as a yield stimulant in this trial.

TABLE I

Comparative Yields Under Different Treatments
Applied November 1952

Month	Controls 100%	Mixture A	2,4-D (sodium)	2,4,5-T (sodium)
Mean pre-treatment	26.5	25.0 (94)	34.2 (129)	30.3 (114)
1st month	31.6	70.0 (222)	72.0 (228)	67.8 (215)
2nd month	29.3	49.5 (169)	51.9 (177)	54.4 (186)
3rd month	28.7	40.4 (141)	38.8 (135)	50.0 (174)
4th month	24.9	26.0 (104)	29.3 (118)	41.9 (168)
5th month	23.2	27.4 (118)	24.7 (106)	37.4 (161)
6th month	26.6	27.3 (103)	27.6 (104)	38.1 (143)
Mean over six months	27.3	40.1 (147)	40.7 (149)	48.2 (177)

Still better results were obtained by substituting a composition containing the normal butyl ester of 2,4,5-T as a one per cent solu-

tion in palm oil for the sodium salt, as shown in TABLE II.

TABLE II

Comparative Yields Under Different Treatments
Applied May 1953

Month	Controls 100%	Mixture A	2,4-D (n-butyl)	2,4,5-T (n-butyl)
1st. month	26.7	56.9 (213)	54.1 (213)	75.6 (283)
2nd month	26.9	37.9 (141)	42.3 (157)	57.2 (213)
3rd month	26.2	29.9 (114)	34.8 (133)	43.7 (167)
4th month	25.3	29.5 (117)	29.0 (115)	33.6 (133)
Mean over four months	26.3	38.6 (147)	40.1 (152)	52.5 (200)

Applied to the bark below the cut at a concentration of one per cent in palm oil, it causes meristematic activity of cortical cells resulting in an increase of bark thickness. When applied at monthly intervals to newly tapped bark above the tapping cut it increases the rate of bark renewal and also the yield.

This novel method of applying a suitable composition not dispersible in water containing the ester of 2,4,5-T above the cut would have the dual effect of increasing both yield and rate of bark renewal.

WHAT WE CLAIM IS:—

1. A composition suitable for treating rubber-bearing Hevea for the stimulation of yield and/or bark renewal and not capable of forming stable dispersions in aqueous media including a lower alkyl ester of 2,4,5-trichlorophenoxy-acetic acid in which the alkyl group contains up to five carbon atoms dissolved in vegetable oil or a mixture of vegetable oil and palm oil sludge or a mixture of vegetable oil and mineral grease.

2. A composition according to the preced-

TABLE I
Comparative Yields Under Different Treatments
Applied November 1952

Month	Controls 100%	Mixture A	2,4-D (sodium)	2,4,5-T (sodium)
Mean pre-treatment	26.5	25.0 (94)	34.2 (129)	30.3 (114)
1st month	31.6	70.0 (222)	72.0 (228)	67.8 (215)
2nd month	29.3	49.5 (169)	51.9 (177)	54.4 (186)
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Still better results were obtained by substituting a composition containing the normal butyl ester of 2,4,5-T as a one per cent solu-

tion in palm oil for the sodium salt, as shown in TABLE II. 5

TABLE II
Comparative Yields Under Different Treatments
Applied May 1953

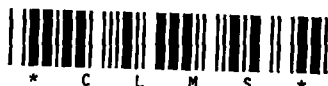
Month	Controls 100%	Mixture A	2,4-D (n-butyl)	2,4,5-T (n-butyl)
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4th month	25.3	29.5 (117)	29.0 (115)	33.6 (133)
Mean over four months	26.3	38.6 (147)	40.1 (152)	52.5 (200)

- Applied to the bark below the cut at a concentration of one per cent in palm oil, it causes meristematic activity of cortical cells resulting in an increase of bark thickness. When applied at monthly intervals to newly tapped bark above the tapping cut it increases the rate of bark renewal and also the yield.
- 15 This novel method of applying a suitable composition not dispersible in water containing the ester of 2,4,5-T above the cut would have the dual effect of increasing both yield and rate of bark renewal.

WHAT WE CLAIM IS:—

1. A composition suitable for treating rubber-bearing Hevea for the stimulation of yield and/or bark renewal and not capable of forming stable dispersions in aqueous media including a lower alkyl ester of 2,4,5-trichlorophenoxy-acetic acid in which the alkyl group contains up to five carbon atoms dissolved in vegetable oil or a mixture of vegetable oil and palm oil sludge or a mixture of vegetable oil and mineral grease.

2. A composition according to the preced-



ing Claim 1 comprising the normal butyl ester of the acid dissolved in vegetable oil.

3. A composition according to Claim 2 comprising a 1% solution of the normal butyl ester dissolved in commercial palm oil.

4. Compositions suitable for treating rubber bearing Hevea including a lower alkyl ester

of 2,4,5-trichlorophenoxy-acetic acid in which the alkyl group contains up to five carbon atoms substantially as described.

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PROVISIONAL SPECIFICATION

Improvements in Systemic Herbicide Compositions

We, THE BRITISH RUBBER PRODUCERS' RESEARCH ASSOCIATION, a Body Corporate duly organised under the Laws of Great Britain, of 19, Fenchurch Street, London, E.C.3, do hereby declare this invention (a communication from Edwin Denis Clifford Baptist, a British Subject, and Petrus de Jonge, a Dutch Subject, both of the Rubber Research Institute of Malaya, Kuala Lumpur, Federation of Malaya), to be described in the following statement:—

This invention relates to the use of systemic herbicides in the treatment of rubber bearing Hevea Brasiliensis either for the purpose of the stimulation of yield or bark renewal.

Selective systemic herbicides comprise substances which, on application, become absorbed in the system of a plant, and above certain concentrations may cause its death. These compounds are growth regulating substances and according to the way in which they are applied may be expected to produce various specific results.

Following the general success of 2,4-dichlorophenoxyacetic acid in agriculture, experiments have been made with 2,4,5-trichlorophenoxyacetic acid, its esters and salts and have shown beneficial results, primarily as a yield stimulant, but also as a bark renewal stimulant and as a tree poison.

The invention, therefore, provides compositions for the treatment of Hevea in the form of a selective systemic herbicide consisting of or including 2,4,5-trichlorophenoxyacetic acid,

its esters or salts or mixtures thereof.

As a yield stimulant for hevea brasiliensis the acid, its esters or salt may be applied to the lightly scraped bark below the cut in water or in vegetable oil (palm oil) or in a mixture of vegetable oil and palm oil sludge or in a mixture of vegetable oil and petroleum grease.

The efficacy of 2,4,5-trichlorophenoxyacetic acid and its derivatives as a yield stimulant to rubber trees has been well demonstrated in our experiments, as shown in the following example. Illegitimate seedlings of ~~clones~~ pil-mocr A44, B50, B58 and of mixed MAP clones planted in December 1931 in Field 14E of the R.R.I. Experiment Station and tapped on the half spiral alternate daily system (S/2.d/2.100%) were used to compare with untreated controls the efficacy as yield stimulants of a proprietary mixture which we have designated as mixture A, 2,4-dichlorophenoxyacetic acid (2,4-D) and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T).

The first application of the treatments on a newly opened panel of first renewal bark was made in November 1952 on a three inch strip of lightly scraped bark below the tapping cut. The sodium salts of 2,4-D and 2,4,5-T were used at a 1 per cent concentration as emulsions in commercial palm oil and the results for the first six months, presented in TABLE I as mean monthly yields of dry rubber in grams per tree per tapping, and secondly as a percentage (in brackets) of the control, show the superiority of 2,4,5-T as a yield stimulant in this trial.



TABLE I
Comparative Yields Under Different Treatments
Applied November 1952

Month	Controls 100%	Mixture A	2,4-D (sodium)	2,4,5-T (sodium)
Mean pre-treatment	26.5	25.0 (94)	34.2 (129)	30.3 (114)
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4th month	24.9	26.0 (104)	29.3 (118)	41.9 (168)
5th month	23.2	27.4 (118)	24.7 (106)	37.4 (161)
6th month	26.6	27.3 (103)	27.6 (104)	38.1 (143)
Mean over six months	27.3	40.1 (147)	40.7 (149)	48.2 (177)

Even better results were obtained by substituting the normal butyl ester of 2,4,5-T for the sodium salt, as a one per cent solution in palm oil, in the second application of the treatments to bark below the cut, as shown in TABLE II. 5

TABLE II
Comparative Yields Under Different Treatments
Applied May 1953

Month	Controls 100%	Mixture A	2,4-D (n-butyl)	2,4,5-T (n-butyl)
1st month	26.7	56.9 (213)	54.1 (213)	75.6 (283)
2nd month	26.9	37.9 (141)	42.3 (157)	57.2 (213)
3rd month	26.2	29.9 (114)	34.8 (133)	43.7 (167)
4th month	25.3	29.5 (117)	29.0 (115)	33.6 (133)
Mean over four months	26.3	38.6 (147)	40.1 (152)	52.5 (200)

- 10 2,4,5-T applied to bark below the cut at a concentration of one per cent in palm oil causes meristematic activity of cortical cells resulting in an increase of bark thickness. When applied at monthly intervals to newly tapped bark *above* the tapping cut it increases the rate of bark renewal and also the yield.

- 15 This novel method of applying the 2,4,5-T above the cut would have the dual effect of increasing both yield and rate of bark renewal.

Experiments have been carried out on the poisoning of old rubber trees by various methods using 2,4,5-T and derivatives. Excellent results have been obtained with the butyl ester of 2,4,5-T and the water soluble amine of 2,4,5-T when applied, at concentrations ranging from 2 to 10 percent and at the rate of about one gallon to 30—50 trees, to a ring-barked portion of the main stem 9 to 12 inches in width or to a frill girdle cut into the wood 20 25

- or by spraying or applying with a paint brush directly onto the bark for a distance of 15 to 30 inches from ground level and also by injection into auger holes bored into the main stem.
- 5 The normal butyl ester of 2,4,5-T dissolved in diesel oil at concentrations of from 3 to 10 per cent and applied directly on to the bark or to the wood after ring barking or frill girdling has resulted in 100 per cent of kills within three months of the time of application. 10
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