REPORT ON ERIOPHYID MITE ATTACK ON KARRI (Euc. diversicolor F.V.M.)

SUMMARY:

1. A short resume is given of the origin and history of the Eriophyid mite attack as observed in Karri regeneration to date in the Manjimup-Shannon River area and from corroborative reports from field officers of the Department at Mt. Barker, Walpole and Margaret River.

2. The occurrence was first observed on 6/7/62 at Shannon River, and identified as such from samples collected then.

3. A short review is made of literature on some of the salient economic facts about Eriophyids as far as known at present.

4. The appearance and results of the attack are described.

5. Recommended means of control are recorded there being three main ways of achieving control viz. chemical, predatorial and fungoid (to a much lesser extent, and only suspect).

6. Literature references are listed which are considered the main sources of information to the present concerning Eriophyid mites.

7. Observations are being continued as opportunity offers and two (2) single trees in different localities are being kept under observation.

INTRODUCTION:

The depredations of this insect first came under observation during the monthly inspection of fertilizer trial plots in Mattaband Cpt. 2, Shannon River on 6/7/62.

The occurrence appeared as a severe wilting of the young growing shoots and leaves on the regenerated Karri crop in that compartment established in autumn 1960 and was at first considered frost bite or a virus condition of an unknown type.

Identification by Mr. C.F.H. Jenkins, Government Entomologist revealed the true cause of the condition observed. The exact species is still not known however.

Following this observation, it was considered worthwhile to follow up the extent and significance of the attack as far as possible and report on the investigations to date. It appears that the effects of this mite are worth checking from the points of view that the seedlings suffer loss of increment won during the previous growing period and are thus held in check during the winter months when growth is at a minimum and are therefore not in a suitable condition to take advantage of the first favourable growing periods. Also, the recipitality of the seedlings is affected, besides harbouring a pest which could attack other forms of agricultural crops.

REVIEW OF LITERATURE:

Literature dealing with Eriophyid mite attacks is limited in the world, being confined predominantly to the U.S.A. and frequently included with references to other insects.

In the U.S.A., Eriophyid mites are of economic importance and have been reviewed by H.H. Keifer. (1)

Local experience with these mites has to the present, as regards severe attacks, been restricted to vineyards and backyard grape vines. (2) The mite Eriophyes vitis evidently originated in Europe, spread to America and reached Australia in 1910 to 1920.

To the present, the exact species has not been determined, and are generally termed gall mites, blister mites, rust mites and bud mites.

They occur most commonly in U.S.A. on citrus trees in California but are also known to attack vines, onions, garlic and tulips together with other host species (1) and is therefore known to live underground.

It is a peculiar insect in that it has only two (2) pairs of legs and is not visible to the naked eye.

APPEARANCE OF ATTACK ON KARRI SEEDLINGS:

Attacks have not been observed on trees greater than about 20' tall and appears least on seedlings below about 3' 6" tall, as are found most frequently in non ashbed localities. Incidence of attack is summarized from the field book covering field fertilizer trials as shown on Appendix 'A'.

The appearance of attack resembles severe frost bite or a virus condition, such as may be seen on tomato plants. The leaves are observed to have patches of discoloured tissue mostly purplish in colour (presumably erineums).

Photographs are appended in an attached folio, showing the typical appearance in different localities.

It should be emphasised, that attacks are confined, as far as observed and reported to Karri regeneration up to about 20' tall. This is an important stage in growth, when the seedlings have weed species to compete with for survival.

Observations to the present do not support the idea that weed species may disperse the mite attacks.

Incidentally, attacks have been observed on Euc-bicostata at Northcliffe, planted about 1961.

Phytoptus pini is reported to attack pine (species unknown) needle sheath.

GEOGRAPHICAL RANGE OF THE ATTACK:

From requests made to various officers of the Department for information on the occurrence of attack, it is evident from the replies and samples forwarded by Mr. Williams, Mr. Rate and Mr. Smart that the region of attack extends from Denmark through Nornalup Karri forest and into Shannon River Karri regeneration. Regeneration in the Northcliffe area does not

seem to be so badly affected but attacks are again severe and widespread in Carey block regeneration (induced by uncontrolled fire in 1961). and extends up the Donnelly River to the northern most extremity of the Karri belt in Netic Block.

Westerly, a report from Margaret River indicated that no attack was noticed last year but was observed near Boranup ~~last~~ the previous year on regeneration.

DESCRIPTION AND LIFE HISTORY: (Extract Bulletin No. 2115 Mr. C.F.H. Jenkins, Dept. of W.A.)

The mites are elongate in form with only two pairs of legs and breathe through the skin. (see diagram of mite - as originally published in Agricultural Gazette of N.S.W.) According to H.H. Keifer (1), there are two (2) main types of mite:-

1. The worm like gall mites and the bud mites.

2. The harder bodied, open leaf mites which are usually more flattened and chunky. The species of this second type which are attached to deciduous trees usually develop deutogynes which are hibernating females which probably cannot reproduce during the season they are formed.

Breeding continues during the spring, summer and early autumn, so that several generations of mite may develop. Before the winter, many migrate under the bud scales and there they remain protected until it is time to attack the next seasons spring growth.

They are considered minute animals about which more information is needed.

RESULTS OF ATTACK:

The results of an attack by this mite are readily obvious: these are from field observations:

1. Loss of height increment, at a time when height growth is important to get seedlings established and growing in advance of weed species. It has not as yet been possible to gauge accurately the extent of such height loss gained during the previous growing period, but seedlings attacked appear likely to lose about 15" - 18" in height as a maximum.

As the attack occurs most severely in mid winter, seedlings are not in a fit condition to take full advantage of the first suitable growing period.

As these attacks occur each year on regeneration till seedlings are about 20' it would seem that a loss of about 4' 0" height growth has been sustained, that is, the time to reach 20' could have been reduced from 3 years to about 2 years (taking current Mattaband growth figures into account). The advantages of this were it possible is obvious.

2. The rectipetality of the plant is affected, in that the growing tips are attacked most frequently resulting in a side or axillary shoot taking over the position of dominant leader. Photograph 8/4/63 shows the condition clearly on a seedling which has been under observation for six (6) months to date. Some observations seem to indicate that the effect on rectipetality is long evident, but observations cannot be related definately to mite attack as the cause, and have not been continued long enough on present observation to confirm or refute the observations.

3. In overall terms, the result of the attack is to set back the Karri seedling growth at a time least desirable and causes a loss of growth of the order indicated. Removal of these pests would, in effect, be equivalent to giving a dressing of fertilizer.

CONTROE OF MITE:

It is noted in Bulletin No. 2115 of Departure of Agriculture of W.A.m that where routine treatments for fungal control are applied with sulphur, the mite has proved of only minor importance.

(i) Chemical Control.

Recommended control on grapevines is the use of lime sulphur spray late in winter just before the buds begin to swell. Dilution recommended is lime sulphur 1 gallon to 10 gallons of water (1 pint to 1¼ gallons).

After the vines have broken leaf, control becomes more difficult, but dusting with flowers of sulphur when the shoots are a few inches long has proved helpful.

Lime sulphur at 1 gallon to 70 gallons of water and colloidal sulphur 1 lb. to 50 gallons of water have also been useful in the early stages of attack.

Sulphur treatments are not recommended during heat waves.

New organic phosphates have not been fully tested but may be useful for spring treatments. e.g. "Hexone", "Phosphone" and "Folidol".

Petroleum oil spray is considered the best all round insecticide in America.

(ii) Predators.

As indicated in "A Review of North American Economic Eriophyid Mites"(1), the most common predators are parasitic mites of the Seius porni type. They occur widely in the U.S.A. evidently but it is not known whether they exist in W.A.. This predator is reported to be most effective on open leave mites, but enter galls when the aperture is large enough, being quite a bit larger than Eriophyids. They are reported to be very common on erineum patches on leaves.

Predacious thrips (3) and Cecidomyid maggots feed on Eriophyids in Californnia. In England, Chaleid wasp larvae are recorded as preying on the black current gall mite in the big buds.

(iii) Fungoid.

It is noted also that when atmospheric humidity is suitable fungi may be a factor in gall mite survival and may be used as a means of control.

A J Hart.

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ASSISTANT ~~DIVISIONAL FOREST OFFICER~~.
SILVICULTURIST.

ACKNOWLEDGEMENTS:

It is wished to acknowledge the assistance received from Messrs. Williams, Rate and Smart in checking the occurrence of this mite in areas under their control.

REFERENCES:

1. "A Review of North American Economic Eriophyid Mites H.H. Kiefer, JOURNAL OF ECONOMIC ENTOMOLOGY Vol 59 pp. 563-70 1946.

2. Bulletin No. 2115 Dept. of Agriculture of W.A. C.F.H. Jenkins (M.A.) Govt. Entomologist "Insect Pests - Vine Leaf Blister Mite."

FURTHER REFERENCES FROM LITERATURE CITED:

1. Anon. 1950. Agric Gaz. N.S.W. Vol. LXI Pt 7 p. 369.

2. Coombe B.G. 1950 Journ. Dept. Agric. S. Aust. Vol LIII No. 7 p. 285.

3. Froggatt W.W. 1920 Agric. Gaz N.S.W. Vol. 31 Aug 1920.

4. Queensland Agricultural and Pastoral Handbook 1951 Vol III p 75.

5. H.H. Keifer 1938-46 Eriophyid Studies 1 - XVI Bul. Cal. Dept. Agr. Vols. 27-35.

6. Journal Econ. Ent. 18 (6) 830 1925 Walther.

MATTABAND Cpt. 2 APPENDIX "A"

Assessment of Euc. diversicolor (Karri) Eriophyid Attack in Fert. Plots.

ASHBED		NON ASHBED	
Plot Nos.	No. of Plants Defoliated (Total No. Plants/Plot : 9	Plot Nos.	No. of Plants Defoliated (Total No. Plants/Plot: 9)
31	9	27	8
30	9	34	7
32	9	36	6
33	9	35	8
37	8	40	8
38	9	41	9
39	9	42	7
44	7	26 (s)	9
43	8	46	9
45	9	47	7
28	9	48	9
29	9	25	9
25 (s)	8	26	7
TOTAL	112	TOTAL	103
% of Total	95.5	% of Total	88

Bulked Observations % Attack

89.5% (1)

Difference of Ashbed % attack to (1)

= +6%

Difference of NonAshbed % attack to (1)

=-1.5%.

Height Ranges of Attacked Seedlings.

(1) Ashbed (11) Non Ashbed

4' 4" → 18' 2" 5" → 7' 1"