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Chemical control of
ya-phet

C RESEARCH CORPORATION OF THAILAND

MISCELLANEOUS INVESTIGATION NO. 36
IMPROVEMENT OF DIPTEROCARP FOREST PASTURE

REPORT NO. 1
CHEMICAL CONTROL OF YA-PHET

BY
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ASRCT, BANGKOK 1972

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CHEMICAL CONTROL OF YA-PHET

By Soonthorn Duriyaprapan* and Prapandh Boonklinkajorn*

SUMMARY

Chemical control of ya-phet (Arundinaria pusilla) was investigated at Sakaerat Experiment Station from June to December 1971. The herbicides used were Lalapon, Gramevin, Dowpon, aminotriazole, Gesaprim, Gesapax, Cyconate, 2,4,5-T, Karmex and Hyvar-X. The study revealed that Lalapon at 1 kg/rai, Gramevin at 1 kg/rai, Dowpon at 2 kg/rai, 2,4,5-T at 1.25 l/rai, and Cyconate at 1 l/rai were conclusively effective.

INTRODUCTION

Ya-phet or bamboo grass (Arundinaria pusilla) dominates in natural grassland in the dry dipterocarp forest of north-eastern Thailand. It has been estimated that the grass covers an area of more than one million rai. This grass is available for grazing during its vegetative growth in the rainy season. At the end of rainy season, the grass attains its reproductive stage and maturity; its tender parts, which are usually palatable to animals, become hard and fibrous, and cattle refuse to graze on it. The grass becomes dry in winter and summer due to inadequate soil moisture. Forest fires or set fires usually burn up the fields; the underground stems, however, still survive and are always ready to send up new shoots when adequate soil moisture is attained.

Manidool and Tosakun (1971)⁺ have studied the digestibility of ya-phet and reported that the experimental wethers lost their body weight feeding on the grass. This study, although without supporting evidences, calls to attention that this grassland should not be over-

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⁺ MANIDOOOL, Chanchai, and TOSAKUN, Phonphen (1971).— โภชนะที่ย่อยได้ของหญ้าเพ็ด.
/ Digestible nutrients in ya-phet. 7 ว.วิทย์.เกษตร. (ASST Newsl.) 4: 119-124.

looked. To improve ya-phet grassland so that it may be profitably utilized by grazing animals, at least two methods of improvement are possible, i.e., complete removal of ya-phet and replanting with adapted pasture grass or grass/legume mixture, and introduction of adapted legumes into the ya-phet grassland.

Removal of ya-phet can be done by mechanical and chemical means, but information and technical data on these are completely lacking. In an attempt to search for primary data for implementation and further studies, an investigation on the efficacies of available herbicides was carried out during June to December 1971 at Sakaerat Experiment Station, Amphoe Pak Thong Chai, Nakhon Ratchasima.

MATERIALS AND METHOD

By the courtesy of various firms, 10 herbicides were supplied and used in these studies. Knapsack sprayers were employed.

i) Preliminary study on the effectiveness of herbicides

Herbicides: Ten herbicides were investigated during 19 June to 7 November 1971. Their initial application rates were recommended by the firms concerned.

| <u>Herbicide</u> | <u>Chemical name</u> | <u>% Active ingredient</u> |
|------------------|----------------------------------------------------------------------|----------------------------|
| Gesaprim | 2-chloro-4-ethylamino-6-isopropylamino- <u>s</u> -triazine | 80 |
| Gesapax | (2 ethylamino)-4-(isopropylamino)-6-(methylthio)- <u>s</u> -triazine | 80 |
| Lalapon | Sodium salt of 2,2-dichloropropionic acid | 85 |
| Gramevin | " | 85 |
| Dowpon | " | 85 |
| Aminotriazole | 3-amino-1,2,4-triazole | 80 |
| 2,4,5-T | 2,4,5-trichlorophenoxyacetic acid | 100 |
| Karmex | 3,(3,4 dichlorophenyl)-1,1-dimethylurea | 80 |
| Hyvar-X | 5-bromo -3-sec-butyl-6-methyluracil | 80 |
| Cyconate | Monosodium acid methane arsonate | 43.5 |

Plot size: 2 x 5 m.

Experimental: Randomized complete block design with 4 replications.

ii) Study on rates of application of effective herbicides

Out of ten, five chemicals were judged effective by scoring. These chemicals were studied for their optimum rates of application. The study was carried out during 7 October to 18 November 1971.

Herbicides: Lalapon, Gramevin, Dowpon, 2,4,5-T, and Cyconate

Plot size: 2 x 5 m

Experimental: Randomized complete block design with 4 replicates (7 October 1971), and complete randomized design (18 November 1971).

iii) Study on split application of herbicides

Repeated application of effective herbicides was conducted during 18 November to 21 December 1971.

Herbicides: Lalapon, Gramevin, Dowpon, and Cyconate

Plot size: 2 x 5 m

Experimental: Complete randomized design with 4 replicates

RESULTS

i) Preliminary study on the effectiveness of herbicides.

Results of this study which are given in Table 1 indicate that the degree of control of the herbicides varied greatly from 1.0 to 4.0 points. Lalapon, Gramevin, Dowpon, 2,4,5-T, and Cyconate were found effective for the control.

TABLE 1. EFFICACIES OF HERBICIDES FOUND IN PRELIMINARY TRIAL.

| Herbicide | Concentration | Solvent | Date of application | Date of checking | Mean ^{1/} |
|---------------|---------------|-----------------------------------|---------------------|------------------|--------------------|
| Gesaprim | 0.18 kg/rai | Water 11 l/rai | 19 June | 19 July | 2.0 |
| Gesapax | 0.08 kg/rai | Water ^{2/} | 19 June | 19 July | 1.75 |
| Lalapon | 2.0 kg/rai | Water 200 l/rai | 19 June | 19 July | 4.0 |
| Gramevin | 2.0 kg/rai | Water 200 l/rai | 19 June | 19 July | 3.88 |
| Dowpon | 8.0 kg/rai | Water 400 l/rai | 19 June | 19 July | 3.5 |
| Aminotriazole | 6.3 kg/rai | Water ^{2/} | 19 June | 19 July | 1.63 |
| 2,4,5-T | 1.0 l/rai | Diesel oil 19 l/rai ^{3/} | 19 June | 19 July | 3.75 |
| Karmex | 1.8 kg/rai | Water ^{2/} | 7 October | 7 November | 1.0 |
| Hyvar-X | 0.54 kg/rai | Water ^{2/} | 7 October | 7 November | 1.0 |
| Cyconate | 0.64 l/rai | Water 60 l/rai | 7 October | 7 November | 3.25 |

^{1/} 1 = negligible damage, 2 = slight damage, 3 = considerable damage, 4 = very severe damage, 5 = killed.

^{2/} Adequate volume as to attain good coverage.

^{3/} Surfactant added.

ii) Study on rates of application of effective herbicides

Based on the rate of application of each effective chemical found in the preliminary study as shown in Table 1, another trial was made on various rates attempting mainly at lower concentrations of the herbicides. Table 2 shows that the recommendable rates of application of Gramevin was 1 kg/rai; Lalapon, 1 kg/rai; Dowpon, 2 kg/rai; 2,4,5-T, 1.25 l/rai; and Cyconate, 1.0 l/rai.

TABLE 2. RATES OF APPLICATION OF SELECTED CHEMICALS

| Herbicide | Concentration | Date of application | Date of checking | Mean ^{1/} |
|-----------|---------------|---------------------|------------------|--------------------|
| Gramevin | 0.5 kg/rai | 15 November | 21 December | 2.88 |
| | 1.0 kg/rai | 15 November | 21 December | 4.25 |
| | 1.5 kg/rai | 15 November | 21 December | 3.38 |
| | 1.5 kg/rai | 7 October | 4 November | 3.88 |
| | 1.75 kg/rai | 7 October | 4 November | 4.06 |
| | 2.0 kg/rai | 7 October | 4 November | 4.25 |
| | 2.25 kg/rai | 7 October | 4 November | 3.89 |
| Lalapon | 0.5 kg/rai | 15 November | 21 December | 1.75 |
| | 1.0 kg/rai | 15 November | 21 December | 4.0 |
| | 1.5 kg/rai | 15 November | 21 December | 4.38 |
| | 1.5 kg/rai | 7 October | 4 November | 2.44 |
| | 1.75 kg/rai | 7 October | 4 November | 2.88 |
| | 2.0 kg/rai | 7 October | 4 November | 3.44 |
| | 2.25 kg/rai | 7 October | 4 November | 4.13 |
| Dowpon | 2.0 kg/rai | 15 November | 21 December | 3.13 |
| | 4.0 kg/rai | 15 November | 21 December | 4.5 |
| | 6.0 kg/rai | 15 November | 21 December | 4.75 |
| | 6.0 kg/rai | 7 October | 4 November | 4.19 |
| | 7.0 kg/rai | 7 October | 4 November | 4.5 |
| | 8.0 kg/rai | 7 October | 4 November | 4.69 |
| | 9.0 kg/rai | 7 October | 4 November | 4.75 |
| 2,4,5-T | 0.5 l/rai | 7 October | 4 November | 2.0 |
| | 0.75 l/rai | 7 October | 4 November | 2.06 |
| | 1.0 l/rai | 7 October | 4 November | 2.19 |
| | 1.25 l/rai | 7 October | 4 November | 3.88 |
| Cyconate | 1.0 l/rai | 15 November | 21 December | 4.38 |
| | 2.0 l/rai | 15 November | 21 December | 4.25 |
| | 4.0 l/rai | 15 November | 21 December | 5.0 |

^{1/} 1 = negligible damage, 2 = slight damage, 3 = considerable damage,
4 = very severe damage, 5 = killed.

iii) Study on split application of herbicides

Table 3 indicates that split application at 15-day interval gave better results for lower concentrations. Gramevin, for instance, at 0.5 kg/rai in one spray, was not able to control ya-phet, but when split into two halves, sprayed 15 days apart, was found effective.

TABLE 3. EFFECTIVENESS OF SPLIT APPLICATION

| Herbicide | Concentration | | | Mean ^{1/} |
|-----------|------------------------|------------------------|------------|--------------------|
| | First (18 November) | Second (3 December) | Total | |
| Gramevin | 0.25 kg/rai | 0.25 kg/rai | 0.5 kg/rai | 3.75 |
| | 0.5 kg/rai | 0.5 kg/rai | 1.0 kg/rai | 4.13 |
| Lalapon | 0.25 kg/rai | 0.25 kg/rai | 0.5 kg/rai | 3.5 |
| | 0.5 kg/rai | 0.5 kg/rai | 1.0 kg/rai | 4.0 |
| Dowpon | 0.25 kg/rai | 0.25 kg/rai | 0.5 kg/rai | 2.0 |
| | 0.5 kg/rai | 0.5 kg/rai | 1.0 kg/rai | 3.75 |
| | 1.0 kg/rai | 1.0 kg/rai | 2.0 kg/rai | 4.75 |
| Cyconate | 0.5 l/rai | 0.5 l/rai | 1.0 l/rai | 4.88 |
| | 1.0 l/rai | 1.0 l/rai | 2.0 l/rai | 5.0 |
| | 1.5 l/rai | 1.5 l/rai | 3.0 l/rai | 5.0 |

^{1/} 1 = negligible damage, 2 = slight damage, 3 = considerable damage,
4 = very severe damage, 5 = killed.

DISCUSSION

As mentioned earlier, the initial study, which in its nature was a screening test, dealt only with the rates of application as recommended by their suppliers. It was learned that the recommendations were made without previous data in support. It was believed that certain chemicals which were found ineffective in this screening test may produce better result at certain concentrations.

Based on such a screening test, the following trials were conducted with chemicals listed in Tables 2 and 3. It is concluded that the effective rate of application of Gramevin is 1 kg/rai; Lalapon,

1 kg/rai; Dowpon, 2 kg/rai; Cyconate, 1 l/rai; and 2,4,5-T, 1.25 l/rai. Cost estimates per rai of each chemical are as follows:

| | | |
|----------|--------------|--------------|
| Gramevin | 34 baht/rai | (34 baht/kg) |
| Lalapon | 34 baht/rai | (34 baht/kg) |
| Dowpon | 72 baht/rai | (36 baht/kg) |
| Cyconate | 44 baht/rai | (44 baht/l) |
| 2,4,5-T | 169 baht/rai | (120 baht/l) |

Lower concentration was found satisfactory when split-sprayed, resulting in lower cost per rai. However, the labour required by such an operation would be double.

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