

保護罩自走式鼓風噴霧車之試驗研究

林永順、曾得洲¹

摘要

爲促進果園施藥機械化，並使施藥人員有較佳的保護，乃進行具有保護罩裝置之自走式鼓噴霧車的研製，使操作噴霧車者進行病蟲害防治噴藥時，能高效率、有效、省藥及安全的作業。

研製完成之保護罩自走式鼓風噴霧車田間試驗結果，保護罩內與室外溫度僅差 1℃，操作噴霧車人員並無悶熱感，能舒適、安全的工作，在十二年生晚侖西亞柑桔果園進行噴藥附著量試驗，噴霧車以 1.0 km/hr 速度行走，撒布量 2400 l/ha 時，水試紙在柑桔葉片的附著量評價在 7.1~8.2 之間。

噴霧車在柑桔果園噴藥與一般果農慣用方式比較每公頃節省施藥量 40%，農藥費節省 40%，工作效率爲一般方式的 8 倍，施藥工資節省 85%。

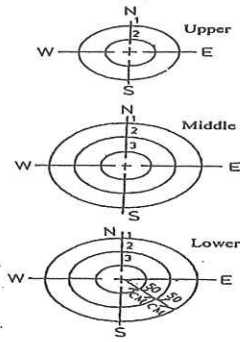
關鍵詞：果園、鼓風噴霧車、保護罩

前言

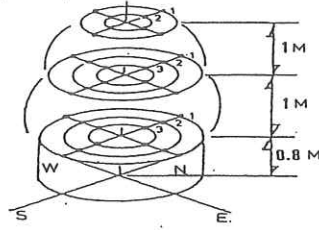
由於本省地理位置處在亞熱帶，天氣炎熱，果樹病蟲害發生率偏高，防治次數頻繁，目前病蟲害之防治方法以使用可移動式高壓動力噴霧機，或裝配定置管路連結高壓軟管，手持噴槍施藥爲最普遍，這種噴藥方法不但所需使用之藥水量多，工作辛苦，效率低而且果農噴藥時須長期接觸農藥，影響身體健康，故亟須改善。

這幾年來，國民生活水準提高，注重自然生態環境之保護，農村勞力缺乏及降低生產成本之要求，對施藥機械要求(一)高效率，使能把握病蟲害防治時機，適時施藥，(二)售價低廉，能大面積使用，節省購置機械之成本，(三)撒布霧粒細，施藥量節省，能在果樹之葉面及葉背上有最佳的附著，對發生在葉背之病蟲害如葉類(紅蜘蛛)等，亦能發揮優異的防治效果，(四)對施藥者在作業中，亦能得到保護，避免接觸農藥，安全的施藥。

¹台東區農業改良場 助理研究員及助理



圖一·柑桔樹冠內外懸掛水試紙分佈測定點
Fig1. Distribution spot of the water-sensitive paper hung in and out citrus canopy



圖二·水試紙在柑桔葉片的懸掛方式
Fig2. Hanging method of the water-sensitive paper on citrus leaf



Water-sensitive paper

三、保護罩自走式鼓風噴霧車果園噴藥與人工噴藥作業比較試驗

在柑桔園施藥適期以噴霧車及人工一般方式以高壓動力噴霧機，手持噴槍施藥，兩種方式進行比較試驗，調查噴藥量、工作效率、藥效評價、施藥工資等。

結果與討論

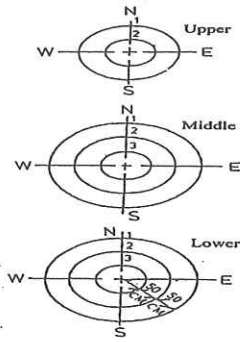
保護罩自走式鼓風噴霧車之構造及規格性能

研製完成之保護罩自走式鼓風噴霧車其主要設計性能規格如表一。

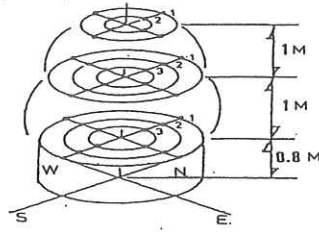
表一·保護罩自走式鼓風噴霧車規格

Table 1. Main specifications of blast-sprayer with cab.

| Item | Description of specification | |
|--|--------------------------------|----------|
| Dimension of home machine (L×W×H) (cm) | 257×111×150 | |
| Type of engine | 10 HP×2 gasoline engine | |
| Shift speed | Forward 6 speed , Back 2 speed | |
| Climbing ability | 20° | |
| Loading (kg) | 650 | |
| Blower | Type | Axial |
| | Diameter (mm) | 450 |
| Spraying system | Model | TS-28 |
| | Pressure (kg/cm ²) | 12-17 |
| | Nozzle size and number (mm) | φ 1.2×16 |
| | Suction volume (l/min) | 40 |
| Stirred tank (l) | 300-400 | |
| Cone angle | 210° | |
| Covered distance (m) | H 5 , W 10 | |
| Operation velocity (km/hr) | 1.0 | |



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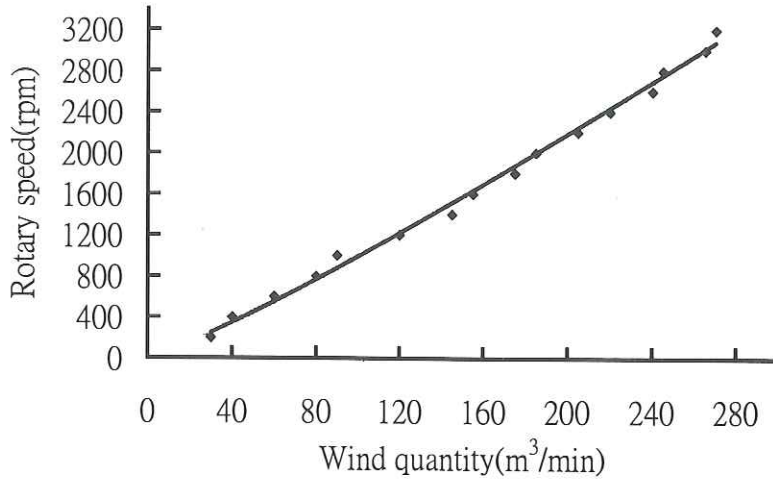
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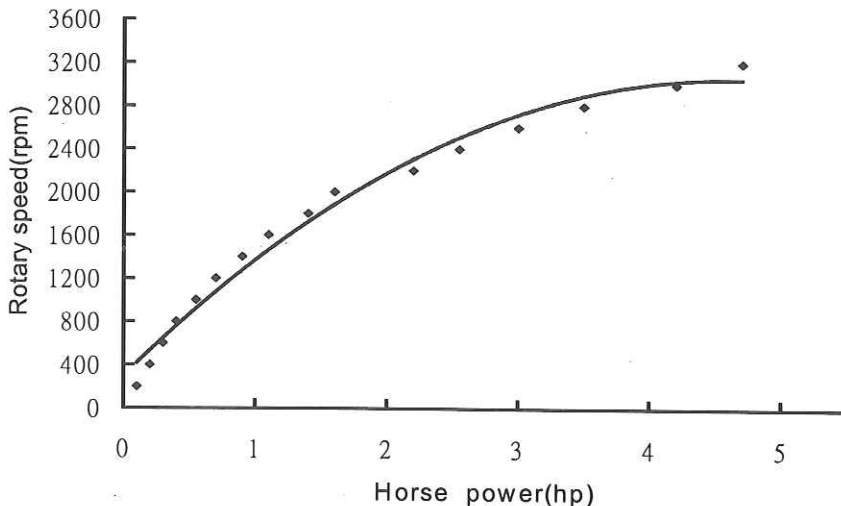


圖四·鼓風機轉速與風量之關係

Fig 4. Relationship between rotary speed of a blaster and wind quantity

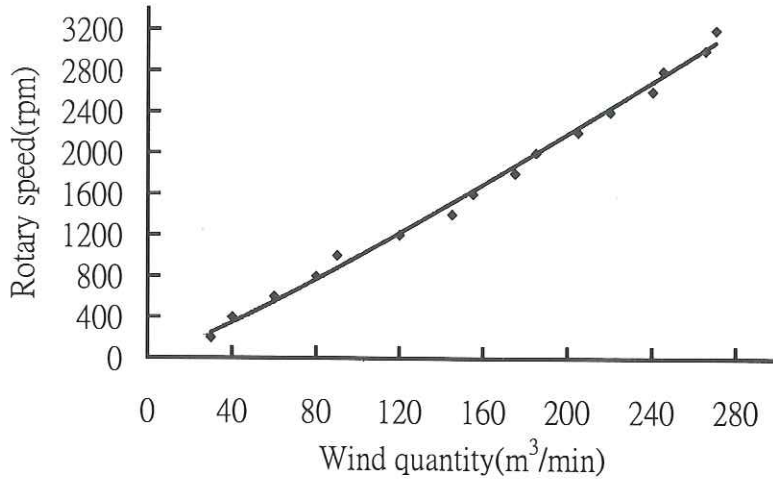
(二) 鼓風機消耗引擎馬力試驗

自走式鼓風噴霧車進行噴藥作業時，其鼓風機在一般以 2500~3200 R.P.M 的高轉速下運轉，產生需求性之大風量，消耗相當大的馬力，本試驗以電動馬達驅動鼓風機，測試其消耗馬力，結果（如圖五）顯示，當鼓風機在 2500~3200 R.P.M 速度下消耗電動馬達馬力 2~4.6 之間，一般汽油引擎需求馬力為電動馬達的二倍，故保護罩自走式鼓風噴霧車設計使用 10HP 汽油引擎一台驅動其鼓風機。



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Fig 5. Relationship between rotary speed of a blaster and consumption of engine horse-power

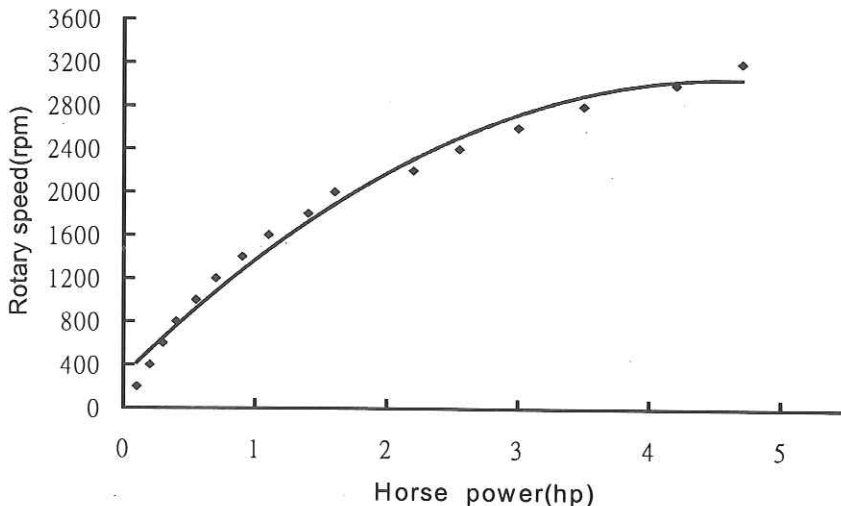


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果園試驗在柑桔葉片附著量測定

保護罩自走式鼓風噴霧車在十二年生柑桔園以 1.0 km/hr 速度行走，每公頃施藥水量 2400 公升，噴撒霧粒在柑桔葉片之附著狀況如表二及表三。

表二·撒布霧粒在柑桔葉面水試紙之附著狀況

Table 2. Adherent status of water-sensitive paper after spraying on citrus leaf surface

| Direction | Location | | | | | | Mean | | |
|-----------|----------|-----|-----|--------|-----|-----|------|-------|-----|
| | Lower | | | Middle | | | | Upper | |
| | 1 | 2 | 3 | 1 | 2 | 3 | | 1 | 2 |
| East | 7.0 | 8.0 | 8.0 | 9.0 | 8.3 | 8.0 | 8.7 | 7.3 | 8.0 |
| West | 7.3 | 8.0 | 8.0 | 9.0 | 8.7 | 8.0 | 8.7 | 9.0 | 8.3 |
| South | 7.7 | 7.7 | 7.7 | 9.0 | 8.0 | 7.7 | 8.3 | 8.0 | 8.0 |
| North | 8.7 | 8.3 | 8.3 | 9.0 | 8.4 | 8.3 | 8.7 | 8.0 | 8.5 |
| Mean(1) | 7.7 | 8.0 | 8.0 | 9.0 | 8.4 | 8.0 | 8.6 | 8.1 | |
| (2) | 7.9 | | | 8.5 | | | 8.3 | | 8.2 |

(註) 1.藥液附著指數 (0~9)，在柑桔病蟲害防治上葉片之附著指數一般葉面在 7.0，葉背 5.0 以上是必要的。

2.上列數值為噴撒在三棵柑桔果樹葉片上之平均值。

表三·撒布霧粒在柑桔葉背水試紙之附著狀況

Table 3. Adherent status of water-sensitive paper after spraying on citrus leaf back

| Direction | Location | | | | | | Mean | | |
|-----------|----------|-----|-----|--------|-----|-----|------|-------|-----|
| | Lower | | | Middle | | | | Upper | |
| | 1 | 2 | 3 | 1 | 2 | 3 | | 1 | 2 |
| East | 7.0 | 7.3 | 6.7 | 8.0 | 7.7 | 7.0 | 7.7 | 6.0 | 7.1 |
| West | 6.0 | 6.8 | 6.7 | 8.7 | 7.3 | 7.7 | 8.3 | 6.7 | 7.3 |
| South | 6.0 | 6.7 | 6.7 | 8.3 | 7.0 | 7.3 | 7.7 | 6.7 | 7.0 |
| North | 6.5 | 6.3 | 6.7 | 8.4 | 7.4 | 7.5 | 7.7 | 6.5 | 7.1 |
| Mean(1) | 6.4 | 6.8 | 6.7 | 8.4 | 7.4 | 7.4 | 7.9 | 6.5 | |
| (2) | 6.6 | | | 7.7 | | | 7.2 | | 7.1 |

保護罩自走式鼓風噴霧車與人工噴藥作業之比較

保護罩自走式鼓風噴霧車在柑桔園噴藥與一般果農傳統以高壓動力噴霧機，手持噴槍噴藥方式在十二年生柑桔園作業之比較試驗結果如表四。

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| | 1 | 2 | 3 | 1 | 2 | 3 | | 1 | 2 |
| East | 7.0 | 8.0 | 8.0 | 9.0 | 8.3 | 8.0 | 8.7 | 7.3 | 8.0 |
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| Direction | Location | | | | | | Mean | | |
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| | 1 | 2 | 3 | 1 | 2 | 3 | | 1 | 2 |
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Yung-Shun Lin and Te-ChouTseng¹

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The field experimental results with the blast-sprayer demonstrated that the temperature between inside and outside cab was only 1°C, therefore the pesticide operator had comfortable and safe feeling but not sultry mood. The experiment of adherent dosage on leaves was conducted at 12 years valencia orchard. When the blast-sprayer was operated at 1.0 km/hr speed the spraying dosage was 2400 l/ha. The assessment of the water-sensitive paper on the leaf's adherent dosage was between 7.1 to 8.2.

Spraying pesticides with the blast-sprayer at citrus orchard could save 40% chemical cost, promote working efficiency 8 times and save application wages 85% as compared to the farmers' traditional spraying.

Key words : Orchard, Blast-sprayer, Protecting cab

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